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PC WORLD

December 1994

SPECIAL YEAR-END ROUNDUP

BEST CDs OF 1994

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IBM's New 486 and Pentium PCs
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XE SERIES.

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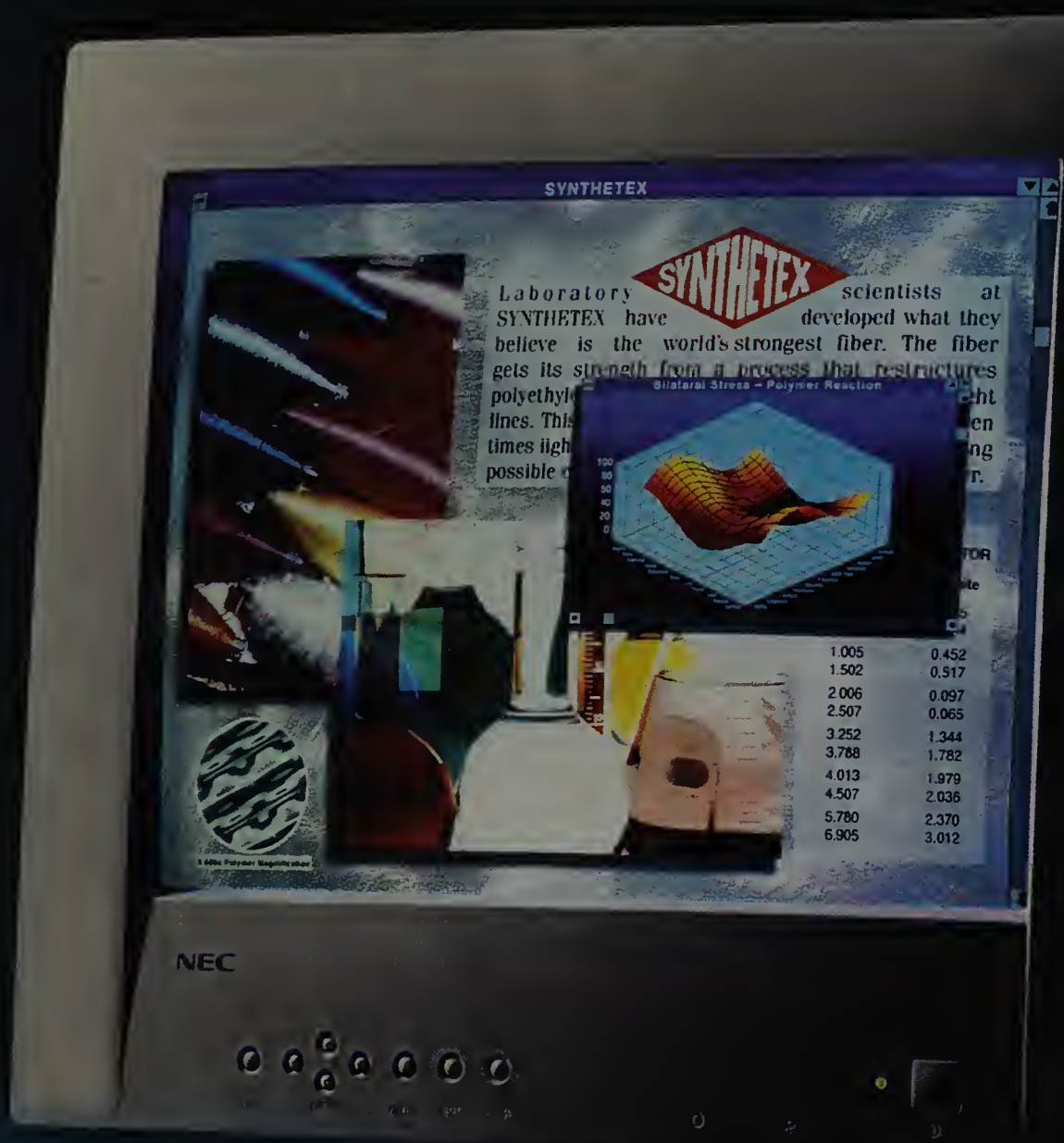
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3.252 1.344
3.788 1.782
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4.507 2.036
5.780 2.370
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NEC

THE ONLY THING T
FINE LINE BETWEE

Three years ago, we embarked on a mission. To design and build the finest computer monitors in the world. Which is a rather ambitious quest. After all, many industry experts already considered the NEC MultiSync monitor, first introduced just over a decade ago, pretty darn close to perfect.

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NEC offers integrated accessories for enhancing X Series monitors including AudioTower speakers and Monitor Lens.

The result? NEC is proud to introduce the MultiSync XE Series of Monitors.

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Then we packed them with features that make them easier to work with. Our On-Screen Manager, OSM™ for short, offers o-

*When used with Plug and Play compatible hardware and Microsoft Windows™ 4.X.

HEY BLUR IS THAT WORK AND PLAY.

s·een controls with animated icons that visu-
ay demonstrate your options. OSM allows
you to control everything from sereen geometry
aid sereen size to eolor temper-
ature. (A veritable field day for
Type A personalities.)

We're also the first to
offer compatibility with the new
Microsoft® Plug and Play stan-
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onfiguration headaches while
automatically optimizes the
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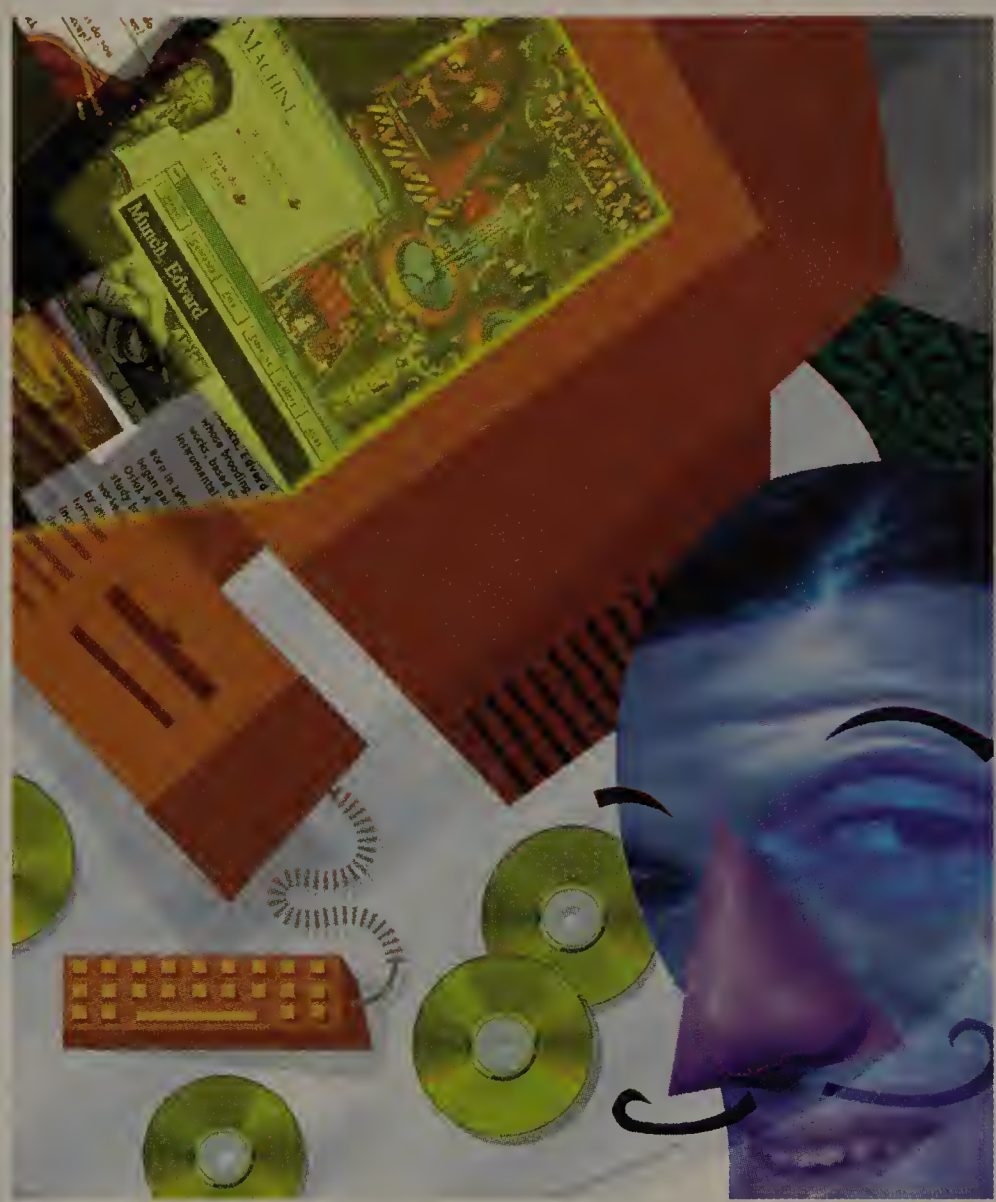

Cover Story/Multimedia

130 Best CDs of '94: Gifts on a Silver Platter
Where do you find the perfect CD-ROM gift for a multimedia maven? We waded through games, travel and entertainment discs, business databases, reference works—CD-ROMs from every jewel box under the sun. These 44 discs shine the brightest. Plus, Top 10 lists from the experts.

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Cover photography by John Greenleigh, digital composition by TX Unlimited/San Francisco

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"This Is As Good As It Gets."

–*PC World* Best Buy, August 1994

It's true! The ZEOS Pantera is as good as it gets. Leading experts from top industry publications all agree that the ZEOS Pantera is the best PC available. Unparalleled in its field, the Pantera has continuously earned award after award–month after month (including two Best Buys from *PC World* in October).

There's no desktop system that comes close to the ZEOS Pantera in performance, reliability, and value. As *PC/Computing* said: "Rocket-fast performance and a great price make this our favorite Pentium of the lot."

Supreme Performance

The ZEOS Pantera, based on Intel's 486 and Pentium processors, is breaking record after record with its supreme power and awesome performance.

"Mark a new high on the performance chart!" *PC World* said the Pentium-66 and Pentium-90 Pantera PCs were "the fastest system(s) ever tested." *PC World* also awarded the Pantera DX4-100 a Power Best Buy in October after it outperformed all other DX4 machines, and was as fast as many Pentium PCs!

The ZEOS Pantera 66MHz and 90MHz also received the highest scores in all benchmark tests run by *Windows Sources*. "The ZEOS Pantera rose above the crowd and posted the most impressive performance numbers."

What makes the Pantera blow all others away–time after time? We start with a ZEOS designed motherboard, one that is created specifically to take full advantage of the latest technological advancements. The motherboard is stocked with exceptional features such as an on-board PCI Local Bus IDE Controller supporting up to four IDE devices. For the fastest video performance, you also get a Diamond Stealth 64-bit PCI video card with 1MB DRAM *standard.*

Valuable Extras

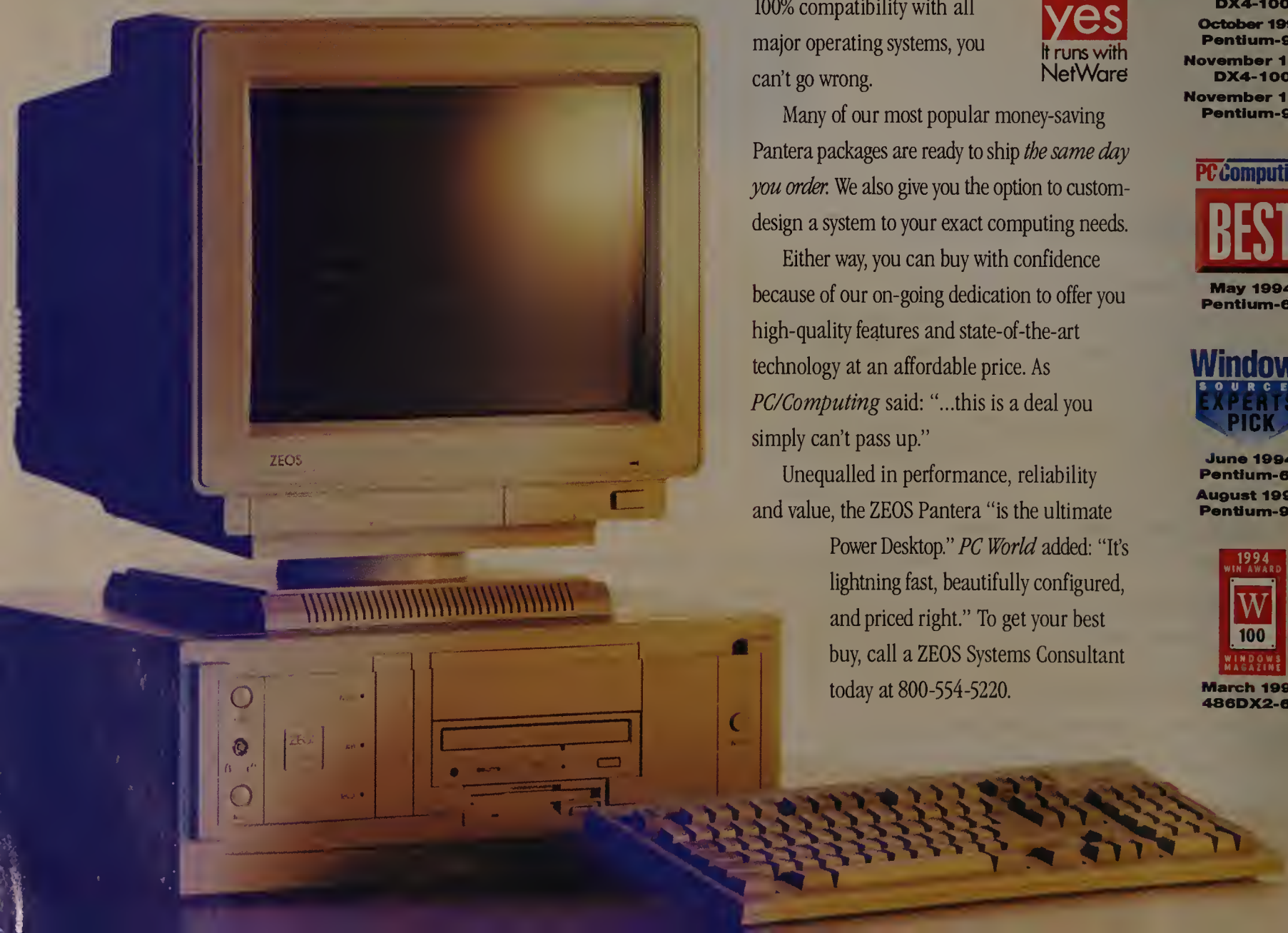
The Pantera is a first-rate example of ZEOS' commitment to provide you with an excellent value on an award-winning machine that will increase your productivity.

With all the extras, options, and 100% compatibility with all major operating systems, you can't go wrong.

Many of our most popular money-saving Pantera packages are ready to ship *the same day you order.* We also give you the option to custom-design a system to your exact computing needs.

Either way, you can buy with confidence because of our on-going dedication to offer you high-quality features and state-of-the-art technology at an affordable price. As *PC/Computing* said: "...this is a deal you simply can't pass up."

Unequalled in performance, reliability and value, the ZEOS Pantera "is the ultimate Power Desktop." *PC World* added: "It's lightning fast, beautifully configured, and priced right." To get your best buy, call a ZEOS Systems Consultant today at 800-554-5220.



PC MAGAZINE EDITORS' CHOICE
April 12, 1994 Pentium-66
June 28, 1994 DX4-100

COMPUTER SHOPPER
April 1994 Pentium-60
August 1994 Pentium-90

PC WORLD BEST BUY
January 1994 486DX2-66
February 1994 486DX2-66
March 1994 486DX2-66
June 1994 486DX2-66
June 1994 Pentium-66
July 1994 Pentium-66
August 1994 Pentium-66
August 1994 Pentium-90
September 1994 Pentium-66
September 1994 Pentium-90
October 1994 DX4-100
October 1994 Pentium-90
November 1994 DX4-100
November 1994 Pentium-90

PC Computing BEST
May 1994 Pentium-66

Windows SOURCES EXPERTS PICK
June 1994 Pentium-66
August 1994 Pentium-90

1994 WIN AWARD W 100 WINDOWS MAGAZINE
March 1994 486DX2-66

Processors	Package 1		Package 2		Package 3		Package 4	
486SX-33	$1395	Lease $59/mo.	$1695	Lease $62/mo.	$2195	Lease $80/mo.	$2695	Lease $98/mo.
486DX-33	$1495	Lease $63/mo.	$1795	Lease $66/mo.	$2295	Lease $84/mo.	$2795	Lease $102/mo.
486DX2-66	$1545	Lease $57/mo.	$1845	Lease $68/mo.	$2345	Lease $86/mo.	$2845	Lease $104/mo.
DX4-100	$1895	Lease $69/mo.	$2195	Lease $80/mo.	$2695	Lease $99/mo.	$3195	Lease $106/mo.
Pentium-60	$1845	Lease $68/mo.	$2145	Lease $79/mo.	$2645	Lease $97/mo.	$3145	Lease $105/mo.
Pentium-66	$1995	Lease $73/mo.	$2295	Lease $84/mo.	$2795	Lease $102/mo.	$3295	Lease $110/mo.
Pentium-90	$2145	Lease $79/mo.	$2445	Lease $89/mo.	$2945	Lease $108/mo.	$3445	Lease $115/mo.

Standard With Every ZEOS Pantera System:

- Genuine Intel® Processor. ZIF socket for easy upgrading.
- Diamond Stealth DRAM PCI local bus color graphics card upgradable to 2MB VRAM.
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- ZEOS 101-key space-saving keyboard.
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- 4MB RAM
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- **Diamond Stealth 64-bit** PCI local bus SVGA color graphics card with 1MB DRAM
- ZEOS 14" 1024 x 768 non-interlaced SVGA color monitor, .28mm dot pitch
- Six-bay desktop case with two cooling fans
- Microsoft Mouse
- MS-DOS 6.2, Windows for Workgroups 3.11

Package 2

- 8MB RAM
- 528MB local bus IDE hard drive with 256K cache
- 2X CD-ROM drive, 3.5" 1.44MB floppy drive
- **Diamond Stealth 64-bit** PCI local bus SVGA color graphics card with 1MB DRAM
- ZEOS 14" 1024 x 768 non-interlaced SVGA color monitor, .28mm dot pitch
- Six-bay desktop case with two cooling fans
- Microsoft Mouse
- MS-DOS 6.2, Windows for Workgroups 3.11

Package 3

- 16MB RAM
- 720MB local bus IDE hard drive with 128K cache
- 2X CD-ROM drive, 3.5" 1.44MB floppy drive
- **Diamond Stealth 64-bit** PCI local bus SVGA color graphics card with 1MB DRAM
- **ZEOS 15"** 1024 x 768 non-interlaced SVGA color monitor, .28mm dot pitch
- Six-bay desktop case with two cooling fans
- Microsoft Mouse
- MS-DOS 6.2, Windows for Workgroups 3.11
- **Lotus SmartSuite**

Package 4

- 24MB RAM
- 1GB local bus IDE hard drive with 256K cache
- 2X CD-ROM drive, 3.5" 1.44MB floppy drive
- **Diamond Stealth 64-bit** PCI local bus SVGA color graphics card with 1MB DRAM
- **ZEOS 15"** 1024 x 768 non-interlaced SVGA color monitor, .28mm dot pitch
- Six-bay desktop case with two cooling fans
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Meridian 800C Notebook

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The 800C also includes a generous 10.3" dual-scan color

800C & 400C now in your choice of screens – including active matrix!

backlit screen for easy viewing (9.5" active matrix display is also available); two Type II or one Type III PCMCIA slots; and an internal 3.5" 1.44MB floppy drive.

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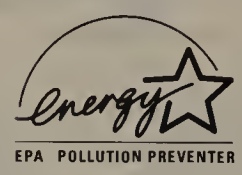

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- Display: 640 x 480 color VGA backlit LCD, up to 256 colors. 400C: 7.8" diagonal STN color. 800C: 10.3" diagonal DSTN color.
- Supports an external SVGA color monitor at resolutions up to 1024 x 768.
- PCMCIA slots: 400C: 2 Type II, 800C: 2 Type II or 1 Type III.
- 84-key keyboard with embedded numeric keypad and 12 dedicated function keys, inverted "T."
- Eraser-shaped integrated TruePoint™ pointing device.
- Replaceable, rechargeable NiMH battery.
- Serial port, enhanced parallel port, external VGA video port, external keyboard or PS/2 mouse port (800C includes both). 400C also with external floppy drive port.
- Full power management features include Low Power mode and programmable Standby features.
- AC-DC adapter with full range from AC110-240V to DC.
- 400C: 7.8" x 10.2" x 1.7"; 3.9 lbs. 800C: 8.9" x 11.7" x 1.9"; 6.3 lbs.
- EPA Energy Star compliant.
- FCC Certified Class B; UL Listed.
- ZEOS Customer Satisfaction package.

Processors	Package 1		Package 2		Package 3	
	400C	800C	400C	800C	400C	800C
486SX-33	$1995	$2295	$2295	$2495	$2595	$2795
486DX2-50	$2195	$2495	$2495	$2695	$2795	$2995
DX4-100	$2495	$2795	$2795	$2995	$3095	$3295
Screen Options						
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- 16MB RAM, 256K SRAM cache
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- 2X CD-ROM drive, 3.5" 1.44MB FDD
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- MS-DOS, Windows for Workgroups, Microsoft Mouse
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- 16MB RAM, 256K SRAM cache
- 528MB local bus IDE hard drive, 256K cache
- 2X CD-ROM drive, 3.5" 1.44MB FDD
- 16-bit sound card, stereo speakers
- Diamond Stealth 64/PCI local bus graphics card with 2MB VRAM upgrade
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- Lotus SmartSuite

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Years of Progress in Ten Months

What a year 1994 has been! In our February issue we started *PC World*'s Top 20 PC ratings. The list, updated monthly, has since become an indispensable guide for PC buyers and a yardstick for the industry. In 1994 the PC World Test Center tested more than 500 PCs in four major categories—power desktop PCs, budget desktop PCs, power mobile PCs, and budget mobile PCs. To pick the winners, our review editors carefully considered every product's relative performance, reliability, service and support, price, expandability, and other features. They then picked the very best overall values each month.

Why Can't Cars Be Like PCs?

Only five PCs made it to number one in the Top 20 Power Desktops, with IBM's ValuePoint P/60D reaching the top twice and the Dell Dimension XPS P90 seizing that spot in July and then defending it successfully five times—astonishing longevity when most PC models are marketed for six months or even less. Back in February, when the Top 20 burst on the scene, the number one power desktop was the ValuePoint P/60D, a 60-MHz Pentium with 16MB of RAM and a 424MB hard drive. Its expected street price was $4995. As you'll see in this month's Top 20, the Dell Dimension XPS P90 sells for $3228 with 16MB of RAM and a 1GB hard drive. If only cars got better *and* cheaper like PCs!

No budget desktop held the number one spot for more than two months. Four machines—the Axik 486DX2-66PCI, the CompuAdd C466D, the Diamond DT 486-66, and the Micron 4100PCI Magnum—held the top spot for two months. In February, the number one budget desktop was the Netis N433VL with a 486DX-33 CPU, 8MB of RAM, a 250MB hard drive, and a price of $1660. This month's pacesetter, the Micron 4100PCI Magnum, offers a DX4-100, 8MB of RAM, and a 420MB hard drive, and costs $2099. So now you pay $400 more for the ideal budget machine, but get double the performance and 170MB more storage.

The March of the Mobile

In the nine months we've been rating portables, six different machines made it to number one in the ranks of power mobile PCs. While two different versions of the IBM ThinkPad 750 were number one for a month each, the Compaq LTE Elite has held the top spot twice and is still fending off an army of fierce competitors this month. When the Thinkpad 750C won the top rank in April, it had a 486SL-33, 12MB of RAM, a 170MB hard drive, a battery life of 3 hours 52 minutes, and it sold for $4699. The reigning champion Compaq LTE Elite offers a DX4-75, 8MB of RAM, a 340MB hard drive, and a battery life of 6 hours 32 minutes, all for a price of $5429. Power notebooks now deliver more power, storage, and battery life, but still command a high price.

The number one ranking in budget mobile PCs has gone to seven different machines, with only two of them clinging to their perch as long as two months: the Compaq Contura Aero 4/33C Model 170 and the IBM Thinkpad 500. Compaq and IBM each had one other model in this category that made it to the top of the chart, and Toshiba claimed the top spot twice with different machines. Back in April, the AST Bravo NB, with its 486SX-25, 4MB of RAM, a 120MB hard drive, and battery life of 3 hours 48 minutes, sold for $2350. Now the leader among budget portables is the Toshiba Portégé T3400, with a 486SX-33, 8MB of RAM, a 120MB hard drive, a battery life of 6 hours 31 minutes, and a price of only $1299. In this case, the ideal machine has twice the RAM, a third more processing power, and almost double the battery life, and it costs little more than half what the leader cost eight months ago. Where budget portables are concerned, there's been as much progress on price as on features.

Many of the desktop machines reviewed in *PC World* now have CD-ROM drives as standard equipment. In case you bought a machine without one, you'll want to read Melissa Riofrio's and Michael Desmond's review, "Best CD-ROM Drives and Sound Boards." Without it, you may not get the full benefit of Michael Lasky's "Best CDs of 1994: Gifts on a Silver Platter." The quality of CD-ROMs that feature education, information and entertainment continues to improve, and the selection grows ever richer. Whether you wish to learn about a medical problem, hear and see poets read their work, tour Australia, find a fine restaurant on your next trip, or introduce children to interactive education, you'll now find valuable CD-ROMs. Your PC is an indispensable tool. It also is now emerging as the progenitor of a magnificent medium. Don't miss out on this major new dimension of personal computing.

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PC MAGAZINE

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PC MAGAZINE UK EDITORS' CHOICE

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August 1993
APC Back UPS 1250

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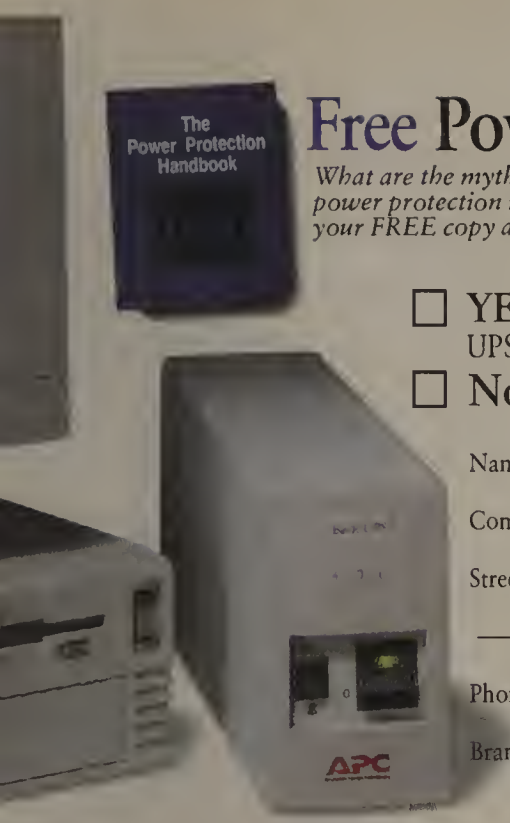

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Andrew Wargo, Manager at Baxter Land Company, tried two other brands before Back-UPS. "One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! I then bought my Back-UPS for less than half of what I had paid for the others. We've purchased three more Back-UPS and for the past 14 months they've been just hummin' away on the same power line that was eating the other brands alive!"

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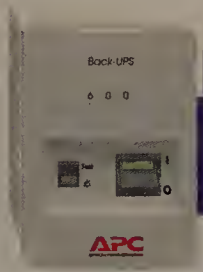

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Circle 45 on reader service card

Dept. P3

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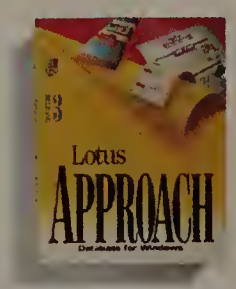

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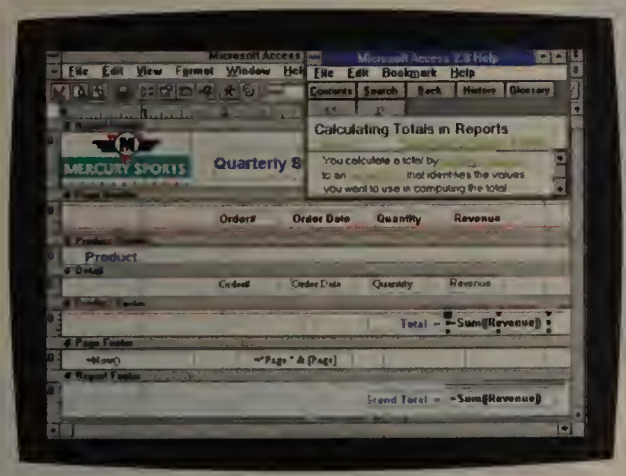
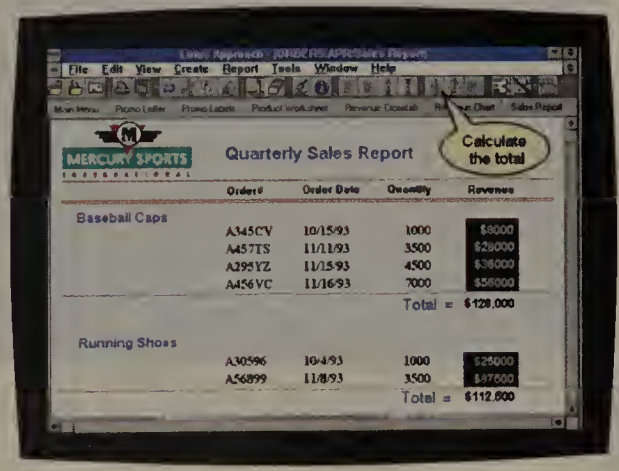


Constructing a report in Access. "Easy"?



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Shopping Strategies, the Two Faces of OS/2, PC Privilege

The Local Angle

I noticed a glaring omission in "The Savvy Shopper" [September]. You didn't mention small, independent local computer shops.

Local shops can offer a level of service that other retail outlets can't match, plus competitive pricing. They can build a computer around your specific needs, and in my experience their service is excellent. I've had a few minor problems with my PC, and they were rectified on the spot, at no charge, even though the warranty had expired.

My dealer always offers the least expensive alternative first. Sure, the superstore will sell you the low-end video accelerator if you insist, but it will also warn you about the "performance hit"—which may not be something that will affect your particular applications—and leave you wondering whether you should have bought that extra VRAM.

The cynic in me hopes this alternative wasn't overlooked in order to avoid angering the big advertising dollars.
Ken Corson, Winfield Park, New Jersey

Author's response: I also enjoy shopping at local momma and poppa shops. In fact, I buy most of my systems at a store near my home. We decided not to include local stores in the article, though, because we didn't think we could generalize from one or two examples in Pasadena. At least with chains, policies, selections, and sales style will probably be similar from store to store.

Watch for local store shopping—along with the pleasures and pitfalls of buying at swap meets—in an upcoming *Home Office*. (And rest assured, I've never been pressured by anyone at *PC World* to write—or *not* write—about specific products, companies, or subjects.) —*Steve Bass*

This Is Not My OS/2 Either

In August's "This Is Not Your Father's OS/2" [*Top of the News*], Joe Abernathy came out with some hilarious opinions and glaring inaccuracies. Windows NT 3.5 is not out on the PowerPC or the HP RISC, any more than OS/2 is out on the PowerPC. Windows 3.11 *does* have built-in networking. And the high-performance file system is present only in OS/2.

The first line of the story betrays its bias: "If Microsoft doesn't make it, I don't need to run it." The story goes on to say, "Preemptive multitasking is fine, but I have enough trouble running one program at a time, let alone multiple applications." Yet in another article in the same issue, multitasking is listed as one of the "Top 10 Reasons to Upgrade" to Windows 95 [page 130].

Abernathy continues, "Virtual DOS machines and crash protection sound good, but if I need a copy of Windows running for every app I want protected, no thanks." That's the same technique being copied in Windows NT. As for Windows 95, all Win16 apps will run in one session, but they'll be cooperatively multitasked just as they are in the current Windows—making them as crash-prone as under Windows 3.1.

Finally, to expect OS/2 to provide compatibility now with what is essentially vaporware that's not due before 1995 illustrates the different standards by which the two operating systems are being judged.
Suvro A. Basu, Las Cruces, New Mexico

Author's response: My article previewed betas of Windows NT 3.5 and OS/2 3.0—it wasn't a formal review of shipping products. According to Microsoft, NT 3.5 will run on the Intel, MIPS, Alpha, and PowerPC platforms. Similarly, IBM promises to port OS/2 to its PowerPC platform. We should have footnoted the chart on page 72 to indicate where its content was based on the claims of the companies rather than on an examination of shipping products. NT 3.5 supports both the OS/2 HPFS and its own enhanced file system.

Concerning your charge that I hold OS/2 to a different compatibility standard than I do Windows, I plead guilty. This version of OS/2 will sell better because of the Internet tools, but nothing IBM has done so far is going to dislodge Windows. Because compatibility with the market leader is important, IBM really does have to live up to a higher standard. With the expiration of the IBM–Microsoft technology sharing agreement, compatibility is no longer guaranteed. —*Joe Abernathy*

OS/2, Today and Tomorrow

I was pleased when you began running a *Here's How* on OS/2 (albeit only one page). I have little interest in Windows, so the many pages you devote to it are meaningless to me. OS/2 offers services Windows doesn't but requires learning a new technology; thus I'm disappointed that the *Here's How* has disappeared.
Murray Grain, Port Huron, Michigan

Editor's response: To help shape *PC World*'s content to meet the needs of our readers, we track readership scores

PHOTO: GARY MOSS; ILLUSTRATION: GLENN MITSUI

on all of our articles. Unfortunately, reader interest in our *Here's How* on OS/2 has been extremely low, so we've dropped the column for now. We will continue to cover OS/2 in other areas of the magazine.

Leveling the Playing Field

Regarding September's *Consumer Watch*, "Unequal Distribution: The Information Haves and Have-Nots": If there's any place where the information have-nots suffer in comparison to the haves, it is in college.

Imagine what it would be like if *PC World* editors could only use their PCs in a big room, elbow to elbow, in 2-hour segments. They have to compete with their *PC Magazine* counterparts, but let's say *PC Mag* has a PC for every individual, and some of its editors even have portables. Tell me how long *PC World* could compete.

That's what the situation is for the have-nots in college on scholarships, grants, and loans. The lack of access to a PC can ultimately defeat scholarship students, or at least prevent them from performing to the best of their abilities.

If any of your readers are interested in helping to level the playing field for students in terms of information technology, they can contact lifeboated@aol.com.

Dick Shoemaker, Internet

PCs: Right or Privilege?

I just read September *Consumer Watch*. What makes Roberta Furger think that owning or even having access to a computer is a right? Why is the lack of a PC a social injustice that must be righted by taxpayers?

Some people don't own cars to get to work, but we don't expect taxpayers to buy them one. Even if we did, *Consumer Watch* might complain that the cars were economy models rather than the "feature-rich" models wealthy people drive.

The Declaration of Independence says you have the right to the *pursuit* of happiness. You have to catch it yourself.

Richard Yeh, Internet

Fascinatin' Rhythm

While Arden Hoffman's review of our music library, Cambium Sound Choice [*New Products*, August], was mostly favorable, I must address two points. Volume One contains 116 music clips, not 70. More important is the issue of musical content.

An essential feature of Cambium Sound Choice omitted from the review is that our music is royalty-free. Fees and restrictions involved in republishing the works of artists such as Miles Davis and Pink Floyd have made multimedia projects expensive and legally complicated. Users of our music pay no royalties and avoid legal hassles.

Though our music has been widely praised, musical taste is subjective. Critiques of the music, however, should be made in the context of its application. We make no apologies for the compositions but emphasize that the music was designed to support, not overshadow, multimedia projects. Cambium offers clean and consistently professional recordings that I believe have significantly raised the standard of multimedia music.

We hope Volume Two, recently released, exceeds Ms. Hoffman's musical standards.

Bud Kroll, president, Cambium Development

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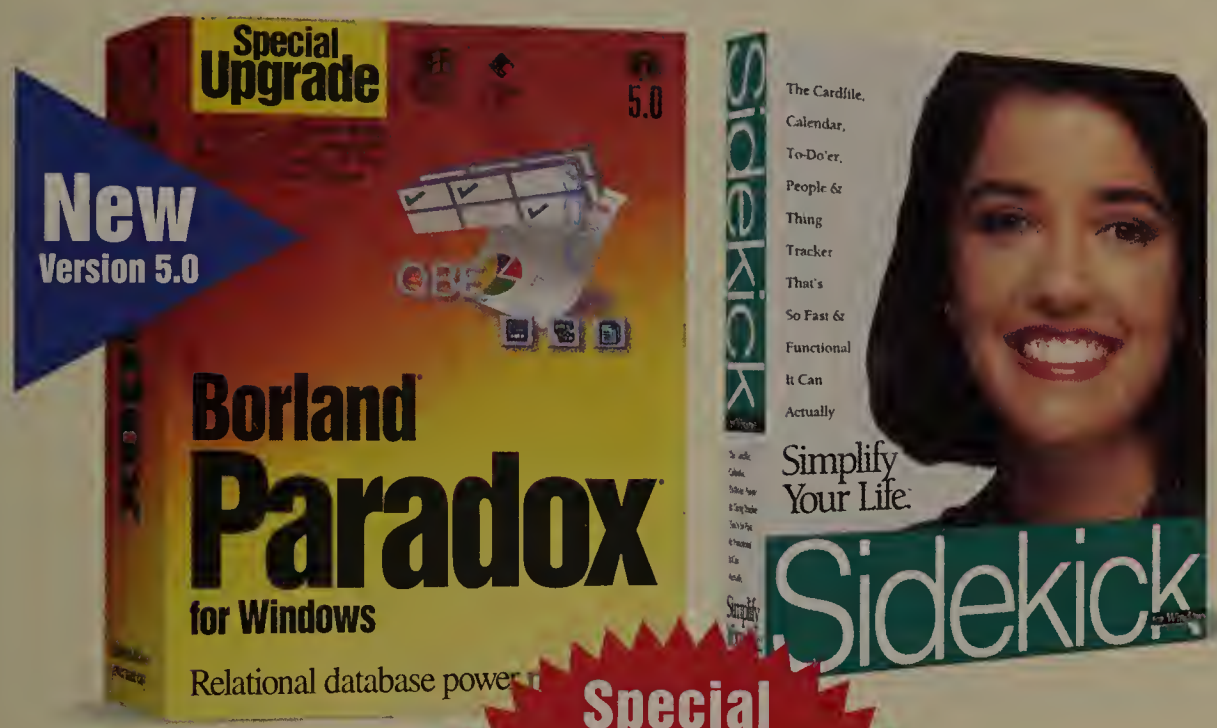

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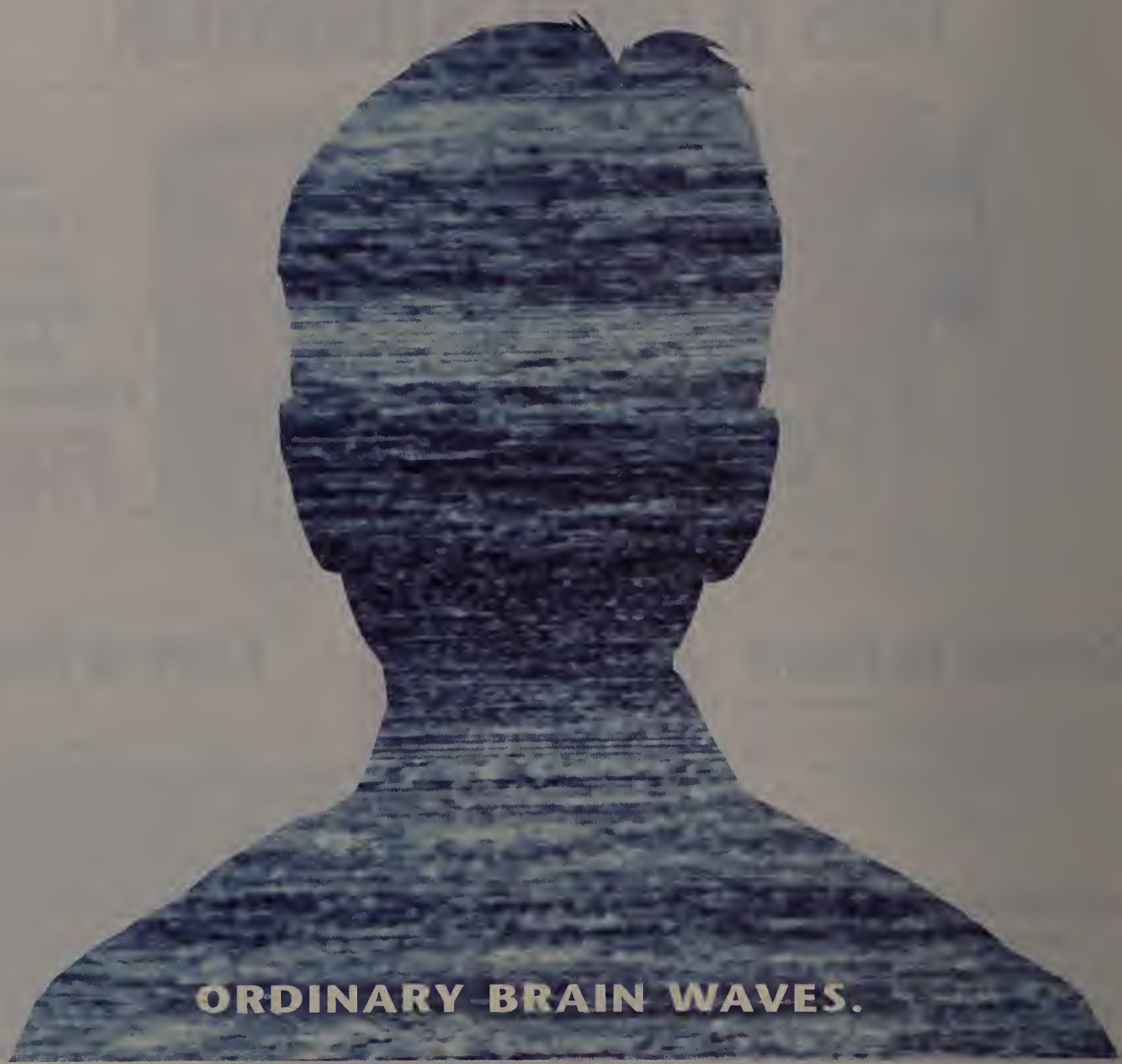

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You're seated in the space shuttle. Far below, mountains, continents and oceans spin by. One click of the mouse and in the astronaut's own voice, history repeats, "...one giant step for mankind."

With an AST Advantage!,™ you don't just access the information. You listen to it, relive it, open your eyes and let your imagination run away with it.

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It makes everything easier, from start-up to getting help from a real live person right on the screen. Now isn't that just the sort of innovative thinking you would expect from one of the world's largest PC manufacturers?

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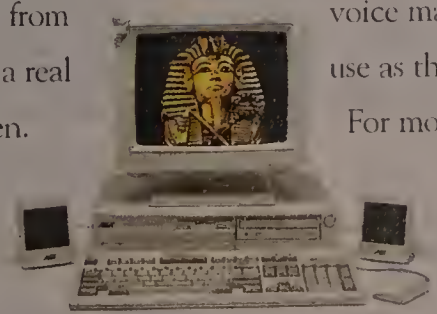

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Now you can use your computer to draw a smile.

That's right. You can now use your PC to draw smiles, laughs and even hard-to-draw things like affection and appreciation. All you need is Gift Maker, the new software that lets you easily create one-of-a-kind, personalized presents that draw the most wonderful responses.

Here's how it works: First, pick from over 35 gift items—mugs to mousepads to teddy bears and more. Next, start designing. Use Gift Maker's 300 templates, 30 different typefaces, and 500 graphic images. Even include your own photos or graphics. When you're finished, the interactive ordering screen totals the order and gives you the choice of sending in your file by modem or on disk. Within days, the gift you created is on its way back to you or to the "gift-getter," complete with card and gift wrap.

So if you're looking for gifts guaranteed to get them grinning, there's only one conclusion to draw: Gift Maker.

The Easy Way to Create Personalized Gifts

MAXIS

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Author's response: The number of clips depends on how you define *clip*. If you count full selections, Sound Choice has 29; if you count each segment of each song, the total is 116. —*Arden Hoffman*

Take That, PC Computing

I used to read another PC magazine (okay, it was *PC Computing*), thinking it was pretty good. But I began to tire of the hyperbole and the assumption that all of us have limitless budgets. So it was with great relief that I discovered your magazine.

I appreciate your editorial judgment. Your reviews are more practical and less glitzy. Your departments are informative and down to earth (and you have a last page worth reading!). I especially enjoy *Real Problems, Real Solutions; Publishing & Presentations; Break Time;* and *Home Office.*
Kurt Neuswanger, Grand Junction, Colorado

Apple Anathema

Anathema! Heresy! I can't believe you devoted an entire editorial to the possibility that the PowerPC platform could be a viable alternative to Windows 95 [*In This Issue*, October]. Still, you failed to mention that although Apple's operating system has a smaller market share, it is more platform-happy—Macs have historically been much more capable of conversing with other platforms than any DOS-based system.

Plug and play? Apple invented it, and it's pretty darn good. I bought a generic internal fax-modem for my Mac laptop, plugged it in, and used it for over 18 months before I ever looked at the manual. But, hey, that might be too easy for "real" computer users.
David Wegener, Internet

Corrections and Clarifications

The AT&T DataPort can't be upgraded to a faster fax or data communications speed as was reported in September's "The Right Connections."

In September's "The Savvy Shopper," we printed an 800 number that Circuit City did not intend to be used as a sales information line. Circuit City requests customers to call their local Circuit City store instead.

PC World regrets the errors.

Letters *welcomes your responses and ideas* *(see page 12 for contact information).*

LOGITECH

LARRY STRIKES A BLOW FOR PERSONAL EXPRESSION AT THE MANILLA VANILLA ENVELOPE COMPANY.

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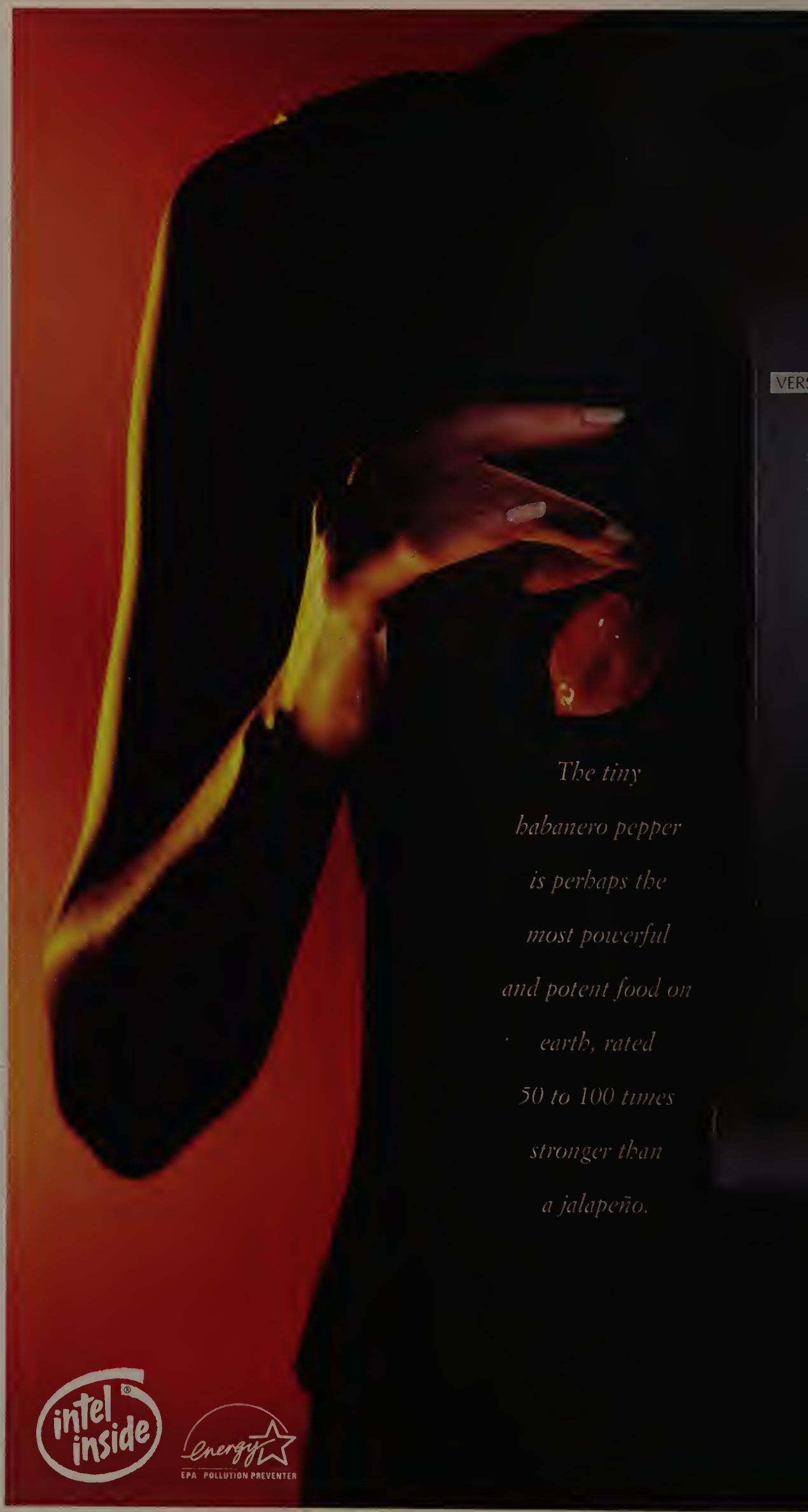

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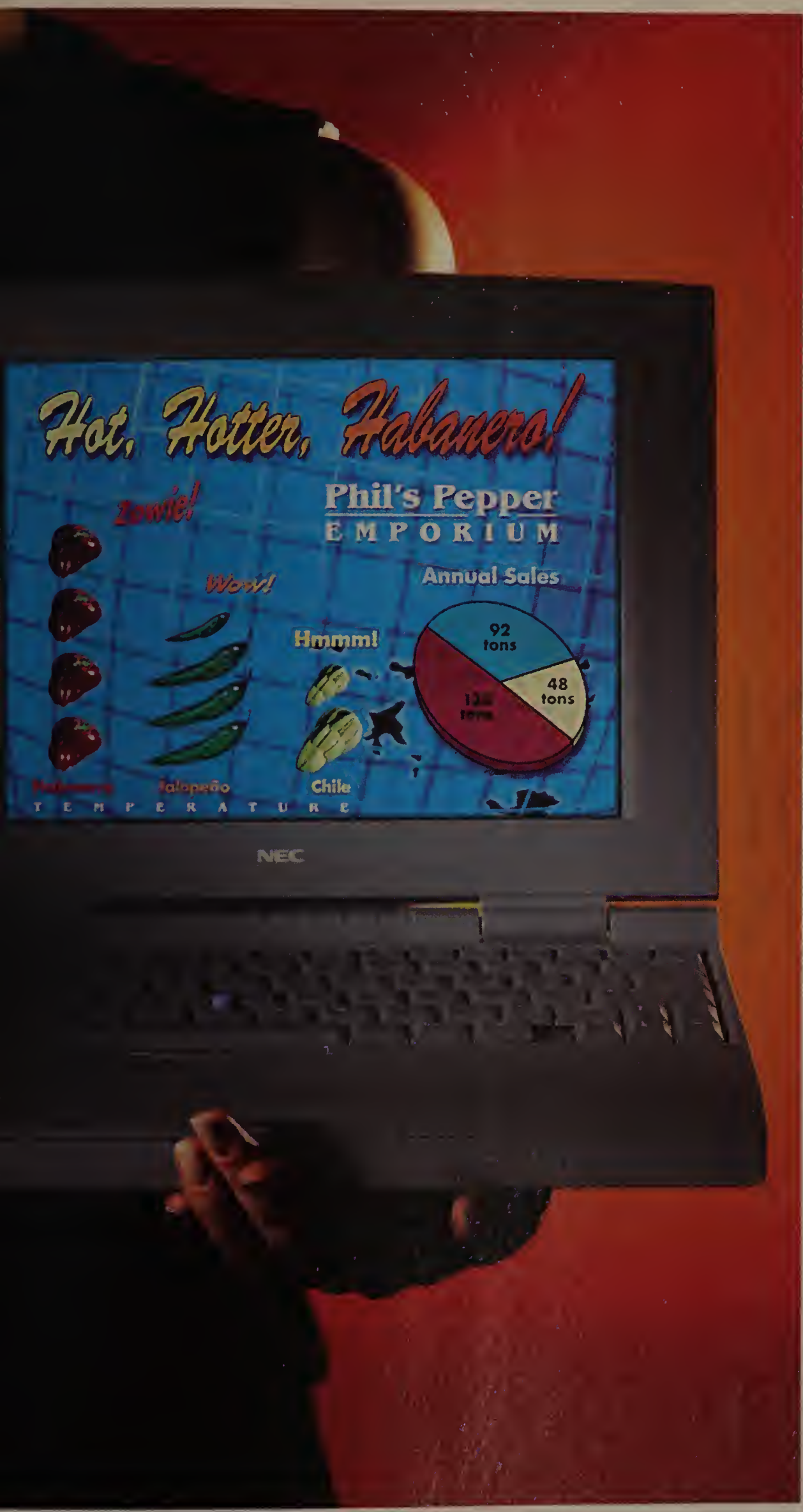

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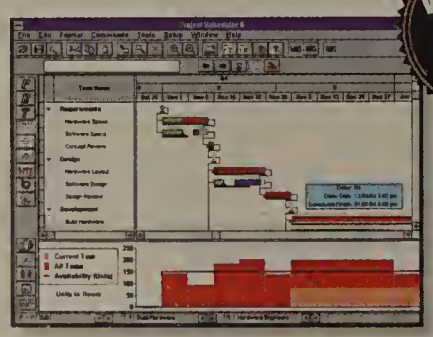

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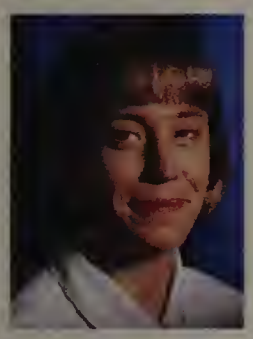
Heroes and Villains: 1994 in Review



What is the most important factor that sets one company apart from its competition? An excellent product? Sure. Competitive prices? You bet. But the real differentiator is service.

Just look at Nordstrom. The Seattle-based retailer has proved to be the touchstone against which companies in all industries are measured. The chain's selection isn't exceptional (except for the shoe department, of course), and the prices aren't great. But you couldn't ask for better service. No one there has so much as blinked when I've returned something—even the shoes I took back after wearing them on a business trip (they gave me blisters). And so, I trek the extra 15 miles to Nordy's—spending a little more in the process.

What does all this have to do with PC hardware and software? A lot. Competition for your buying dollar is fierce, and the way companies of all stripes get—and keep—your business is by consistently and unequivocally putting the customer first. That may mean delaying a software upgrade rather than releasing a bug-ridden product, or it may mean encouraging technical support representatives to stay on the phone a few minutes longer to make sure the customer is satisfied before he or she hangs up.

Exceptional customer service can be expensive. But smart companies know the extra effort pays for itself in repeat business. Following in the tradition of *Macworld* columnist Deborah Branscum, I've pulled together the customer service heroes—and villains—of 1994.

Heroes

Compaq Computer and **Microsoft**, for including warning labels on their new keyboards about the potential risks associated with typing at a PC. Sure, both companies were motivated by potential legal liabilities, but the warnings—and accompanying ergonomic guidelines for use—are an important step in educating PC users and their employers.

AST, AT&T, Compaq, Dell, Gateway 2000, Hewlett-Packard, Leading Edge Products, Midwest Micro, and **Zenith Data Systems,** which are among the companies introducing three-year warranties on all their desktop PCs. Anyone who's had a part fail in the 13th month of PC ownership understands the value of having a full three years of protection. At the rate new processors are introduced, the PC may be obsolete before the three-year warranty expires. Chances are you'll be ready to buy a new PC by then.

Canadian company **Corel Corporation** of Ottawa, Ontario, for delaying (yes, *delaying*) release of the Corel Ventura module of CorelDraw 5.0. Corel decided to postpone inclusion of the desktop publishing package in favor of additional quality control testing—a welcome change from its previous practice of releasing buggy updates.

Micron Computer of Boise, Idaho, for consistently providing customers with the best service of any company in *PC World*'s Reliability and Service Monitor. Since our monthly questionnaire began, respondents have rated Micron highest in service. Now, if only Micron would devote the same amount of attention to quality control...

PC Connection of Marlow, New Hampshire, for rating tops in customer service among mail-order companies in our annual World Class balloting. Established in 1982, PC Connection has survived many rocky times in the PC business, due largely to its combination of competitive prices for hardware and software and excellent service.

Peachpit Press of Berkeley, California, for being the first computer book publisher to address health and safety issues for PC users. *Zap! How Your Computer Can Hurt You—and What You Can Do About It* by Don Sellers is an informative guide to everything from the potential hazards of radiation to repetitive-strain injuries like carpal tunnel syndrome. There's even a section on children—a nice addition, since many of our kids are also PC users.

By Roberta Furger

KEEPING UP

Self-destructing disks or self-destructing policy? DeScribe, maker of the DeScribe 5.0 word processor for OS/2 and Windows, attempted a full assault in September against software piracy by changing its licensing policy. Under its new license, 5.0 ships with a built-in expiration date, but by signing a Continuing License Agreement users can obtain disks that won't cease functioning (which would have happened under the company's original plan). The agreement requires customers to take "all reasonable steps to prevent unauthorized distribution and/or use of the product." ...$2 buys you a booklet of tips for green computing. The State University of New York at Buffalo is on a campaign to conserve energy—and to save money. It has produced the *UB Guide to Green Computing*, which contains such basic but valuable advice as turning off your monitor when you're not using it—you'll cut down on radiation as well as save energy. To obtain the booklet, send a check for $2 (made out to SUNY Buffalo) to Conserve UB Program, University Facilities, John Beane Center, SUNY Buffalo, Amherst, NY 14260.

MICHELE CLEMENT

Villains

America Online, for launching a huge marketing campaign for new users, without first beefing up its computer system. For months, customers complained about getting booted offline, or about a slow response when they *were* on. AOL claims to have corrected many of the problems, but customers still report difficulties logging on at the higher access speeds.

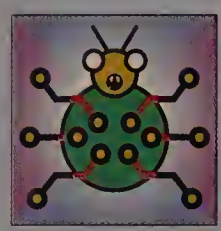
Computer Associates and **Meca Software,** for making tax time just that much worse for users of their tax preparation software. Meca's packaging led buyers to believe the "early bird" version of its software could be used to actually prepare and file a return. It can't. The company was fined $17,500 by the state of Massachusetts for misleading packaging. Computer Associates was never fined for its actions, but it wound up with egg on its face all the same. The company's offer of a "free" copy of Simply Tax wound up costing customers $13.90 ($9.95 for the "early bird" version, plus $3.95 for the final edition). CA refunded the $3.95 fee after many customers complained.

Comtrade Electronics and **Cornell Computer Systems,** two companies that stand alone among PC companies for their abysmal showing in *PC World*'s Reliability and Service Monitor. In our best-to-worst ranking, Comtrade and Cornell were rated worst in every measure of reliability and service, from the number of problems reported, to the length of time it took for customers to get them fixed.

Intel, for failing to deliver on its promise to release its long-awaited Pentium upgrade chip, the Pentium OverDrive processor. PC companies began including a socket for the elusive chip back in mid-1992. And many customers snatched up these so-called Pentium upgradable systems, with an eye toward upgrading cheaply once the Intel chip was released. As of this writing, Intel expects to ship the Pentium OverDrive processor by the end of this year. Of course by that time, you'll probably be ready to just buy a full Pentium system...

Microsoft, for releasing an incredibly buggy version of Word for Windows 6.0. The interim fix (6.0a) corrected many of 6.0's problems, but not before many users suffered through corrupted files, General Protection Faults, and incompatibilities with some Word 2.0 features.

BUG WATCH



Adobe Type Manager 3.0

According to Adobe Systems, the combination of Adobe Type Manager (ATM) 3.0, versions 3.56 and 3.58 of Microsoft Windows' PostScript printer driver, and PageMaker's Set Width command doesn't work properly if you are trying to change the width of printer-resident PostScript fonts in a document. Using the command to increase font width results in narrower fonts; decreasing font width likewise widens them. You can avoid the problem by replacing Microsoft's PostScript driver with version 2.11 of Adobe's PostScript driver, which costs $24.95.

Adobe says that besides the font glitch, users of Epson and Seiko printers that use the ESC P-2 printer language driver may experience General Protection Faults under Windows after installing ATM 3.0. To avoid the problem, turn off the 'Use prebuilt or resident fonts' option in the ATM Control Panel.

In addition, Novell LAN Workplace and Farrallon PhoneNet users may be unable to launch Windows in some situations after installing ATM 3.0, a problem for which there is no workaround.

Adobe has released an update—Adobe Type Manager 3.01—that fixes all three problems and better supports a new version of Adobe Acrobat as well. To receive the ATM 3.01 patch file on disk, call or fax the company's Customer Support PC Type group. You can also download the patch file, 301.EXE, from Adobe's BBS or from CompuServe (GO ADOBE).

- Adobe Systems Customer Support PC Type Group; 408/986-6520, 408/562-6767 (fax)
- Adobe Systems BBS; 408/562-6839
- Adobe Systems Sales (PostScript driver); 800/833-6687

WinFax Pro 4.0

Delrina Corporation released a patch to WinFax Pro 4.0 in early September that allows the program to function as a client to the company's WinFax Pro 4.0 for Networks server. Although Delrina doesn't admit to any outright bugs in the initial version of Winfax Pro 4.0, the company states that the update does "resolve a couple of minor Issues." These issues include problems exiting Windows without first closing WinFax Pro, CAS DCX files not being deleted from program logs along with events, inaccuracies in cover pages in group mailings, and incompatibilities with links to personal information manager programs, such as Symantec's ACT for Windows.

If you purchased WinFax Pro 4.0 recently, you may already have the updated code. To check whether your copy already incorporates the update, choose *Help • About* and look at the fourth or fifth line in the dialog box. If the date is earlier than July 28, 1994, you do not have the update. To receive it on disk, send your name, address, phone number, and product registration number by electronic mail to Delrina at 76300,2500 on CompuServe.

Microsoft Flight Simulator 5.0

Microsoft has released an update patch to Flight Simulator 5.0 that fixes hardware conflicts and adds new features. Flight Simulator 5.0a shortens pauses during flight while scenery is loading, improves joystick responsiveness, improves stall and spin flight equations, and corrects a problem with Pentium systems in VGA mode. Version 5.0a also adds a new and faster 320-by-200-pixel resolution, 256-color VGA mode, improved viewing of airports at a distance, and a more realistic-looking "Aircraft Damage from Stress" effect.

You can download the 1.4MB patch file, FS50A.ZIP, from CompuServe (GO HOTGAMES), or call Microsoft customer service at 800/426-9400 for an update disk by mail.

—Scott Spanbauer

Have you run into a software bug or hardware incompatibility? Call us at 415/978-3253 with the details. We'll investigate problems and report on those with the broadest interest. Due to the volume of queries, we may not be able to return your call, and we cannot provide technical support.

Scott Spanbauer is a contributing editor for PC World.

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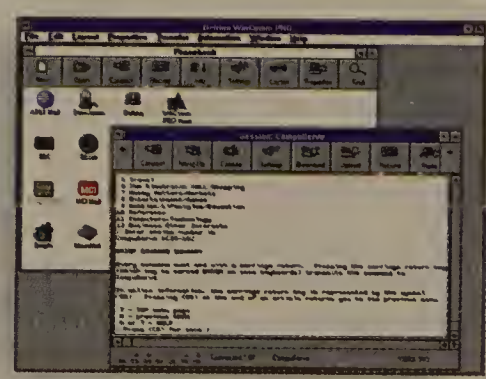

With WinComm PRO, all the most popular on-line services are just a click away.

Best of all, you can get WinComm PRO in the Delrina Communications Suite,™ which also includes Delrina WinFax PRO 4.0, the best-selling, full-featured fax application in the world. Two best-of-breed products for one low price.

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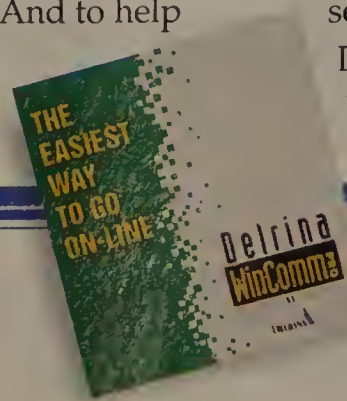

PC Computing MVP FINALIST December 1994

May 30, 1994

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SYSTEM REQUIREMENTS: Minimum/Windows 3.1 386 25Mhz, 4Mb RAM, 10Mb Free Disk Space. Recommended: MPC Level 2 PC (486SX, 8Mb RAM, SVGA, CD-ROM)
FILE FORMATS SUPPORTED: Video/VFW, AVS, MPG, MOV. Animation/FLC,FLI, AWI, AWM. Audio/WAV, MID, RMI, CD Audio. Graphics/BMP, WMF, DIB, PCX, TIF, EPS, GIF, WPG, DCX, PCT, PCD, JPG, TGA.

Circle 190 on reader service card

Symantec, for its even buggier release of its personal information manager, Act 2.0 for Windows. Problems with the release could fill a small book, ranging from difficulties importing files from Act for DOS, to corrupted databases. As Microsoft did with WinWord, Symantec issued an interim update to correct the errors.

That's my list. Now, I'd like your nominations. Mail, fax, or E-mail me your list of customer service heroes and villains (see contact information on page 12). It's never too early to start planning the list for next year's column.

Shop Talk

Reading Between the Lines

After researching the cost of buying generic memory modules for my Compaq computer from a local dealer, I decided to order a Compaq-brand memory module from LA Trade, as advertised in *PC World.*

When the part arrived at my office, I called LA Trade to ask how I could be sure it was a genuine Compaq part, since I had examined the memory module and did not see any indication that it was made by Compaq. The person I spoke to at LA Trade informed me that it was *not* a Compaq memory module and said that this was noted in the ad.

I am extremely disappointed. I thought this type of consumer deception didn't occur with vendors who advertise in reputable computer magazines. I am enclosing a copy of the ad and a copy of the invoice where the Compaq part number is used as a description of the item shipped.

I plan to return the memory module. The total cost of $366 is not an incidental item in my budget.

June Klaassen, Oklahoma City

Editor's note: After looking at the LA Trade ad in question, we can see why Ms. Klaassen assumed she was buying a genuine Compaq part. The product is listed under the heading, "Compaq memory modules"; actual Compaq part numbers are used, and a boldface line above the logo says, "All products are Brand [sic] new & guaranteed. We buy excess inventory."

When we asked LA Trade's president Brian Flynn if he thought the ad might be misleading, he said no. He referred us to the fine print of the ad, which contains the following disclaimer: "All manufacturer parts #'s are for reference only." This disclaimer, according to Flynn, should signal to customers that the company is only matching Compaq-compatible parts with Compaq part numbers and thus is not selling the real thing.

LA Trade has taken back Klaassen's memory, less a 20 percent restocking fee (which the company said she could use toward a future purchase).

To avoid similar confusion—whether intentional or not—be sure to read the fine print; if you're still not sure what you're buying, ask for clarification. And bear in mind that most magazines—this one included—don't have the resources to review advertisements.

On-Site Unseen

As a consultant, I recently recommended the purchase of 486 systems from Gateway 2000 to three clients.

Two days after I delivered one of the systems to a client, it failed to boot. It stopped after reading the BIOS chip and asked for a password. Using the recovery disk that came with the system didn't solve the problem, so I suggested that my client call Gateway's technical support for help.

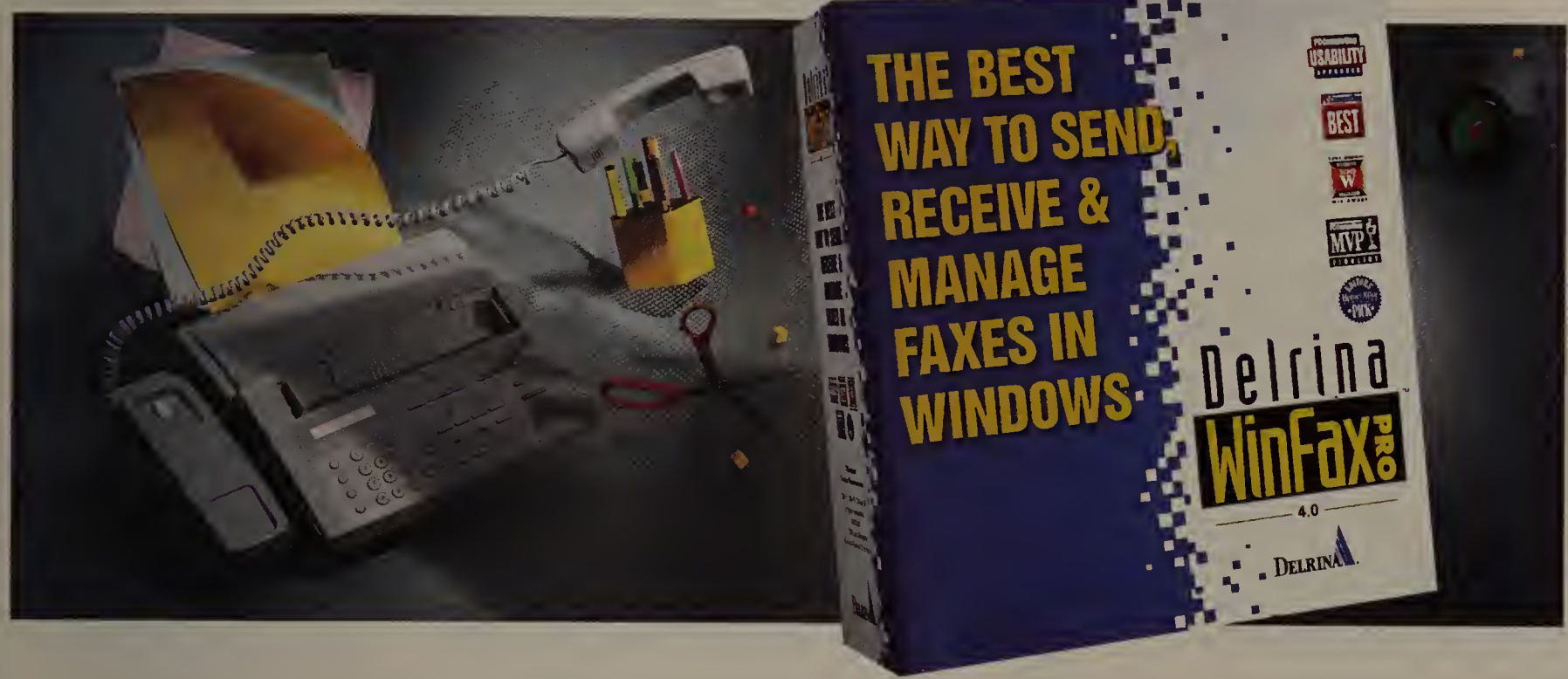
The technician wanted these novice users to enter the system and "find jumpers J20, pins one and two." That's like asking an auto mechanic to perform brain surgery while receiving telephone instructions from a neurosurgeon.

The Gateway computer was purchased with an advertised one-year on-site warranty, so I suggested that Gateway dispatch a local technician to fix the problem. The technician refused to authorize on-site repair and offered no other solution. When I suggested returning the system, he gave me a return authorization number. I asked to speak to a supervisor, who supported the technician's position. I am amazed that a company would jeopardize an otherwise good customer relationship in this way.

John Stribling, Chicago

Editor's note: We've received a number of letters from readers who have had difficulty getting on-site service from Gateway for problems ranging from faulty video cards to motherboard failures. Many of these customers said they didn't feel comfortable taking apart their machines and trouble-

Introducing Delrina WinFax PRO™ 4.0. You'll wonder how you ever faxed without it.



Meet the fastest, easiest, most convenient way ever to handle all your faxing – new Delrina WinFax PRO™ 4.0, the latest version of the best-selling fax software in the world. The only one that combines the advanced faxing features you need with astonishing new ease and usability.

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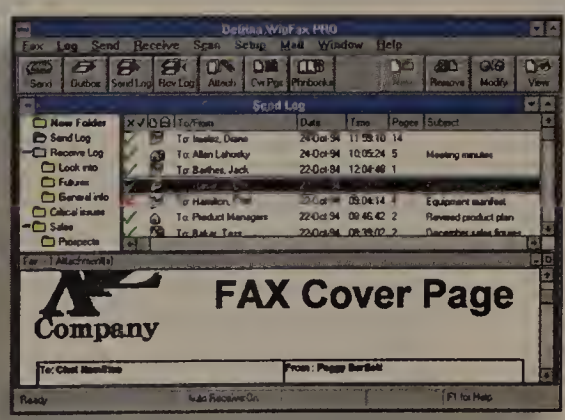
There's added convenience with dozens of ready-to-use cover pages. Fax phonebooks that are drag-and-drop simple. And improved fax annotation tools that even let you add your signature.



Based on extensive usability testing, the new customizable interface includes folders for organizing sent and received faxes.

Don't try this with a fax machine.

Imagine faxing, not just an image of a document, but the actual file itself*, so it's ready to be used in an application. Imagine sending a single document that is automatically faxed to some people and e-mailed to others.

Now imagine you're on the road, and WinFax PRO automatically forwards faxes to you. Or lets you retrieve faxes sent to your regular fax number*. And there's more.

Get new Delrina WinFax PRO 4.0 today and put faxing where it really belongs – on your PC. Call now for information or to upgrade from WinFax PRO or WinFax LITE™. Or see your local dealer to upgrade immediately.

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*Requires Class 1 modem.

Circle 99 on reader service card

shooting, as they were told to do by Gateway technicians.

A Gateway spokesperson said the company's policy is to ask customers to perform simple repairs, such as unscrewing the cover to adjust a cable or snap in a card. Because Gateway's on-site technicians are employed to install parts, not to diagnose problems, Gateway expects customers to perform certain tests and system checks to determine the problem.

For anything more complicated, such as a motherboard replacement, Gateway said it will send an on-site service person without question.

From the letters we've read, however, it seems a certain amount of persistence and what one reader termed "huffiness" may be required.

If you want to perform more challenging repairs—as Gateway claims many customers prefer to do to save time or learn about their computer—a Gateway technician will walk you through the procedure.

In Stribling's case, Gateway believes the diagnosis falls into the easy-to-do category and so stands behind its technician. The company representative we spoke to added that if a customer cannot perform an easy repair or diagnosis due to physical impairment, Gateway will send an on-site service person regardless of the repair.

That's Service!

The hinge on my IBM 700C notebook broke. The repair required replacing several different parts, including the keyboard frame, the hinges themselves, and the base components.

The troubleshooting group at IBM ThinkPad Easy Serv quickly identified all the required parts and checked the inventory to see which were in stock. Some of the parts were back-ordered, but since I could still use the computer, the techs suggested I hang in there until all the required parts were in. On a Friday afternoon IBM sent FedEx to pick up my 700C, did the repairs, and had it back to me the following Tuesday—at no charge. Not only did the company's service people make the repair, they also checked out the system to make sure no other problems might be in the offing.

No hang-ups—just real heads-up service!

John P. Corya, Palm Beach, Florida

Shop Talk was written and researched by Sarah Klein. Think you've gotten a raw deal—or a great one? Consumer Watch *wants to hear about the details. We'll investigate complaints and publish letters with the broadest interest (see page 12 for contact information).* ■

POWERTIP no. 312

Deleting Words in Word

In Word for Windows, you don't have to select a word and then press <Delete> to delete it. Instead, you can place your cursor at the beginning of the word and press <Ctrl>-<Delete> or place it at the end of the word and press <Ctrl>-<Backspace>.

Shane Devenshire
Walnut Creek, California

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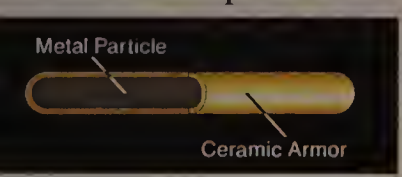

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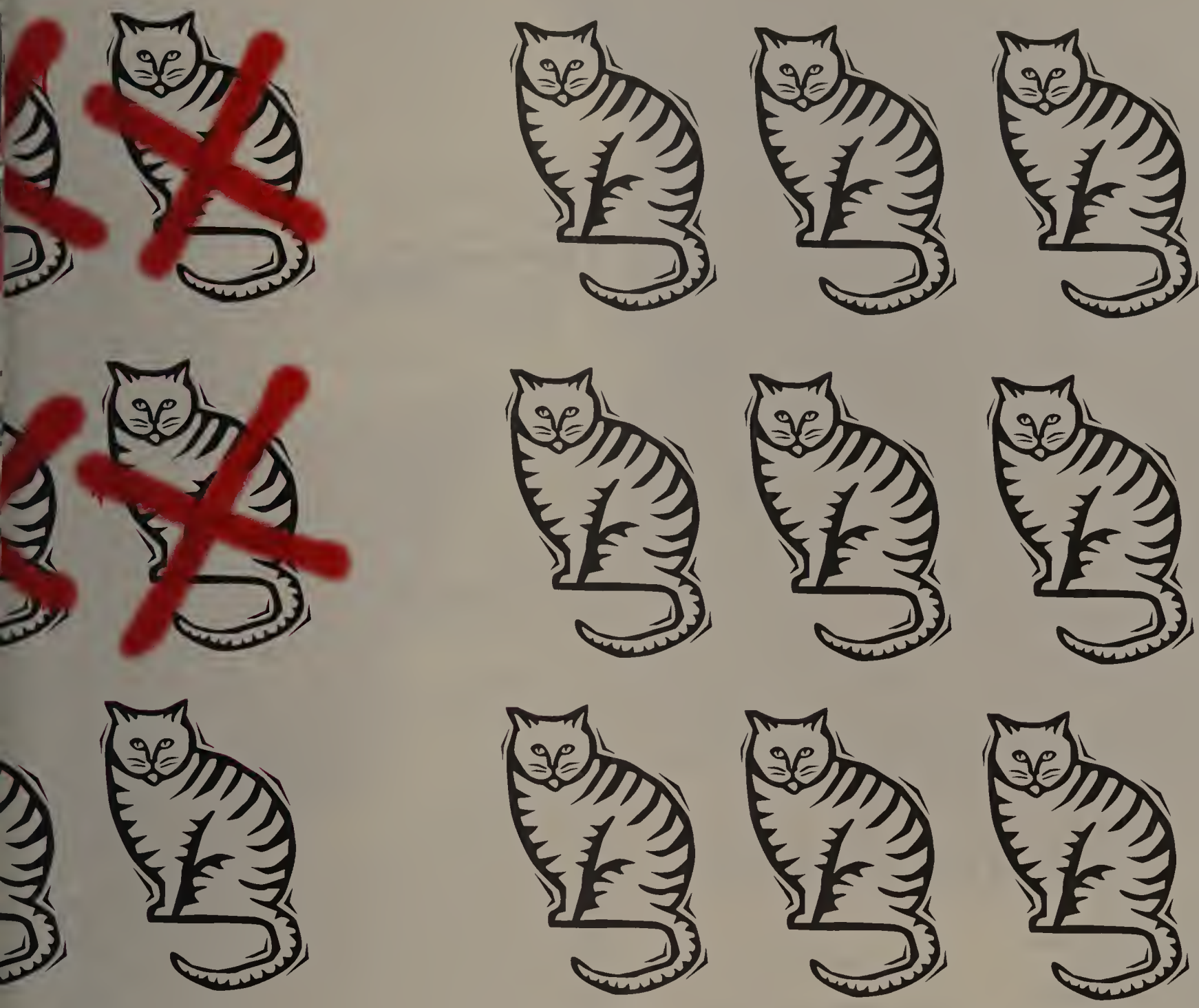

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Netting a Job

In the old days—before an Internet address became de rigueur—most of us found jobs the old-fashioned way: poring over Sunday papers and professional newsletters, calling up headhunters, or getting chums to beat the bushes. Though the majority of job-seekers still use these methods, those people are quickly losing out to the ones who know how to hunt online. With thousands of fresh jobs posted on the Internet, America Online, CompuServe, Prodigy, and hundreds of bulletin board systems each day, the applicant with the fastest modem wins.

Online job posting is a boon for employers, too. According to career columnist Joice Lain Kennedy, author of *Electronic Job Search Revolution*, it typically costs a company more than $5000 to fill a position using traditional methods such as placing newspaper ads—and many times that amount to go through a headhunter. Posting jobs online costs comparatively little and pulls immediate responses from qualified candidates whose computer literacy is already self-evident.

This month Bruce Brazell, the newly hired director of the Alice G. Wallace Planetarium in Fitchburg, Massachusetts, describes the method he used to find his current job by letting his modem do the walking. —*Ed.*

Widening the World

What are the chances of finding a perfect job—a fascinating, career-making position in a competitive field—with a good salary, a nice location, and colleagues who are like family? One in a hundred? A thousand? I don't know. But there's one thing I do know: When I used resources on the Internet to help my wife hunt for a job, I never imagined I'd find my own dream job.

During my college days, I'd already held a dream job as a research assistant in the university's planetarium. I got to work in a research observatory, teach astronomy labs, and operate the planetarium for groups of schoolkids. It was the best of all worlds, combining my love of teaching and research with my passion for light years. That job was a hard act to follow.

After graduating with a B.S. in physics from West Texas A&M University in 1991, I settled into a variety of high school science teaching jobs in small Texas towns like Aspermont and Nacogdoches while working on my master's degree in physics and astronomy. I'd found these jobs through the usual paper postings at city government and school offices, and in the Sunday classifieds. Teaching was fun, but I yearned to find a position like my old one at the planetarium. Unfortunately, planetarium directorships are about as easy to find as—well, black holes and quarks.

Bruce Brazell, planetarium director in Fitchburg, Massachusetts

The Perfect Job

Last May, while I was working as a science teacher in Trenton, my wife was looking for a job where she could use her training as a historian. She had tried all the usual resources, with no luck. I decided to help her by perusing the Internet's job sources. I fired up my IBM 386 PC and my 2400-bps modem and logged on to the Texas Educator's Network, an online service for teachers. The T-net, as it's called, has a gateway to the Internet. Soon I was poking around the Internet's Gopher server list, looking for a server that listed careers. I struck gold on Gopher when I found the Online Career Center (msen.com), where a national job database called Help Wanted USA listed thousands of brand-new, open positions.

The Online Career Center's database allowed me to search for job opportunities by state or job description. By using keywords such as *archive*, *education*, and *historian*, I pulled up several listings. Most of the jobs required a Ph.D., putting my wife out of the running. Then, on a lark, she suggested, "Why don't you look up 'planetarium'?"

So I did. And there, flickering on my computer screen, was a description of my dream job; it had just been posted that day. The Fitchburg, Massachusetts, civic center was looking for a full-time director for a down at the heel planetarium, someone who would reopen and revitalize the place, locate grants, develop community programs, and turn the planetarium back into the star it once was. I began to fantasize. Such a position would open the way to a lifelong career in astronomy. I could practically feel those Ph.D. robes. It couldn't be more perfect.

But Massachusetts? I'd hardly ventured as far as Dallas. Nevertheless, at my wife's urging I sent a standard,

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paper-based résumé and cover letter to the address listed on screen. If the civic center employers had given an E-mail return address, they would have heard from me immediately. But most employers who list jobs online still prefer paper or faxed responses. (The Career Center also allows job-seekers to post their résumés, so employers who are looking for talent can easily take their pick of listed candidates by using keywords like *manager*.)

A few weeks later, I received a letter from the civic center saying their people would be in touch with me. After a few telephone conversations, I was invited to come to Fitchburg. The day I interviewed, I got the job. I was the only out-of-state candidate, selected from among 48 applicants.

The Online Advantage

As it turned out, I was also the only person who had responded to an online ad. The civic center had no idea the job had even been posted because David Davidowicz, the owner of an online job-hunting organization in Leominster, Massachusetts, called Job Finders, had seen the job listing on the civic center's bulletin board and had posted the job through his service as a favor to the city. My employers were amazed and delighted that I'd found the job through the Internet. (This also demonstrated to them that I knew my way around a computer.)

Having found my dream job online, I'm convinced this is the only way to go. Who wants to waste time searching the papers, driving a car, talking for hours on the phone, or eating dozens of rubber-chicken dinners in the hope of hooking up with the right people? Especially when an online job-hunter can easily search through huge databases of fresh postings from home in a single evening. My wife is still looking for a job in her field, but she stands a better chance of finding one in Massachusetts.

I was able to get a hard-to-find job in a faraway place, one that I would otherwise never have thought existed. Best of all, my search cost me almost nothing.

Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. *If you use PCs to manage people and other resources in a business environment, we want to hear from you (see page 12 for contact information).*

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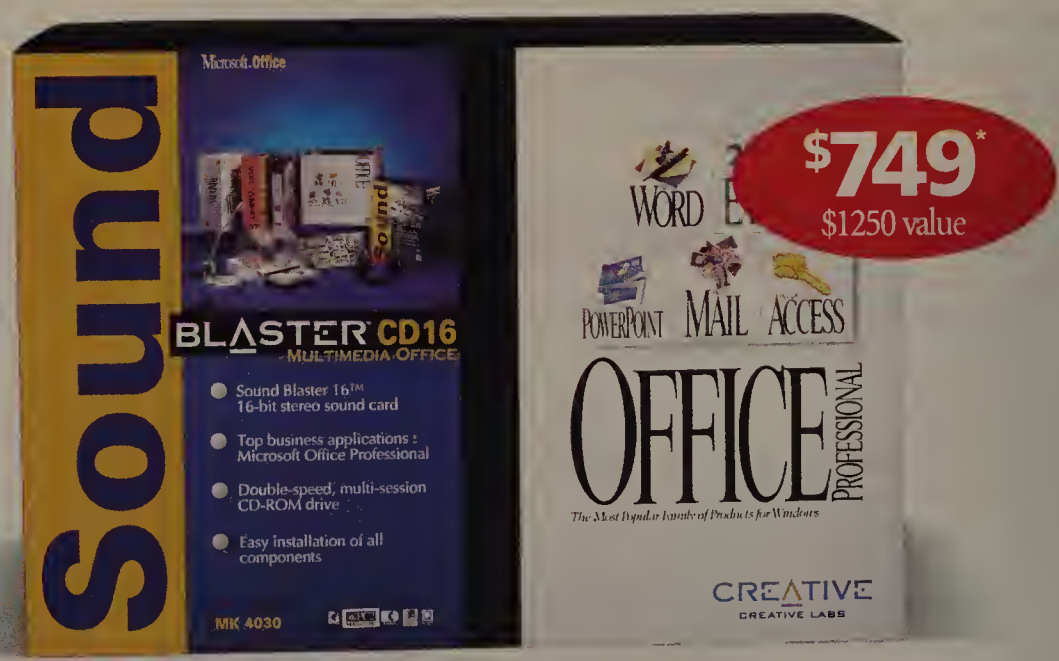

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Of course, with Microsoft Office Professional you get Excel,® Word,® PowerPoint,® Access,® and Mail.®** You also get Microsoft Encarta®—the best-selling multimedia encyclopedia. You even get an Office Professional training system on CD-ROM.

Sound interesting? Just visit your nearest Creative Labs dealer. Or call 1-800-998-5227 Ext. 109.

CREATIVE
CREATIVE LABS, INC.
MULTIMEDIA IS CREATIVE

*Estimated street price for Sound Blaster Multimedia Office: under $550.00. Estimated street price for Microsoft Office Professional (and Encarta): $699.00 **Microsoft Mail is a workstation license: must acquire Microsoft Mail program separately. All Microsoft Office Professional documentation is provided in an easy to use on-line format. ©1994 Creative Technology Ltd. The Sound Blaster and Creative Logos are registered trademarks. Sound Blaster Multimedia Office, Creative VoiceAssist, Creative TextAssist and the Sound Blaster Compatibility Logo are trademarks of Creative Technology Ltd. All other trademarks are the property of their respective holders.
U.S. inquiries: Creative Labs 1-800-998-5227. International inquiries: Creative Technology Ltd., Singapore. TEL: 65-773-0233. FAX: 65-773-0353.

Circle 53 on reader service card

Finally, Expense Report Software That Adds Up

No fanfare this month, just a few practical solutions for some everyday problems.

I looked for years for the perfect expense account manager—and came to the conclusion it doesn't exist, primarily because employers impose such different reporting and documentation requirements. The hassles of business travel are matched only by the challenges of reimbursement.

QuickXpense

The real solution is to have your company's form built into the system you use—a service provided for users of QuickXpense for Windows from Portable Software Corporation (street-priced at $69.95). I haven't had mine done yet, but I've seen some complex forms created for other companies. I'll bet the product is flexible enough to satisfy the most efficient bean counter.

Lots of people have designed decent methods to input expenses—it's getting them out in the proper format that's the problem. I've been using a Newton-based product, but QuickXpense is much more flexible. It tells you how much the company owes you, tracks your company credit card charges, and even reminds you when to file reports.

The interface is a close copy of the Quicken look-and-feel. You could think of QuickXpense as Quicken for expense reports, using the same format of fields and pick lists Quicken users have come to love. • *Portable Software; 800/626-8620. Reader service no. 882*

A Remote File Manager

AnyPlace is a 32-bit Windows application that provides remote file management for telecommuters. You call your office machine, and your portable snatches an image of your networked file system. This replicated file system lets you choose files for later downloading or synchronization without being attached to the network. The next time you call or reattach to the local area network, AnyPlace handles all the file exchanges and helps you deal with the errors that occur when both the remote and local versions of the file have changed since the last synchronization.

The street price is $129. Future versions will also manage your electronic mail and faxes, and a multiuser version is due in 1995. The company offers a 30-day money-back guarantee, so you can test the software yourself. • *Symmetrical Technologies; 603/598-4477. Reader service no. 883*

Customer Surveys by a Pro

For years I've put off doing customer surveys, mostly because I'm not a math nut and needed a tool that would automate the process, from designing the survey document to interpreting the results. Now I have one: Survey Pro for Windows, from Apian Software, is the newest version of a program that has been running under DOS since 1991. It provides a WYSIWYG interface for building your own survey form—including all those tiny boxes, numbered scales, fill-in-the-blanks, and other survey elements.

Creating the survey form also builds a database for entering the responses. The $695 product is being bundled with a 5-user copy of Entry Pro, a DOS program for entering survey responses. The response database is used by Survey Pro to create reports that can include statistical functions such as percentages, counts, mean, median, standard deviation, minimum, maximum, sum, and top-box percentages.

I got started using Survey Pro without reading more than three pages of the documentation and managed to create a nice survey, which I am sending to my customers. Survey Pro comes with free technical support and a 30-day money-back guarantee. • *Apian Software; 800/237-4565. Reader service no. 884*

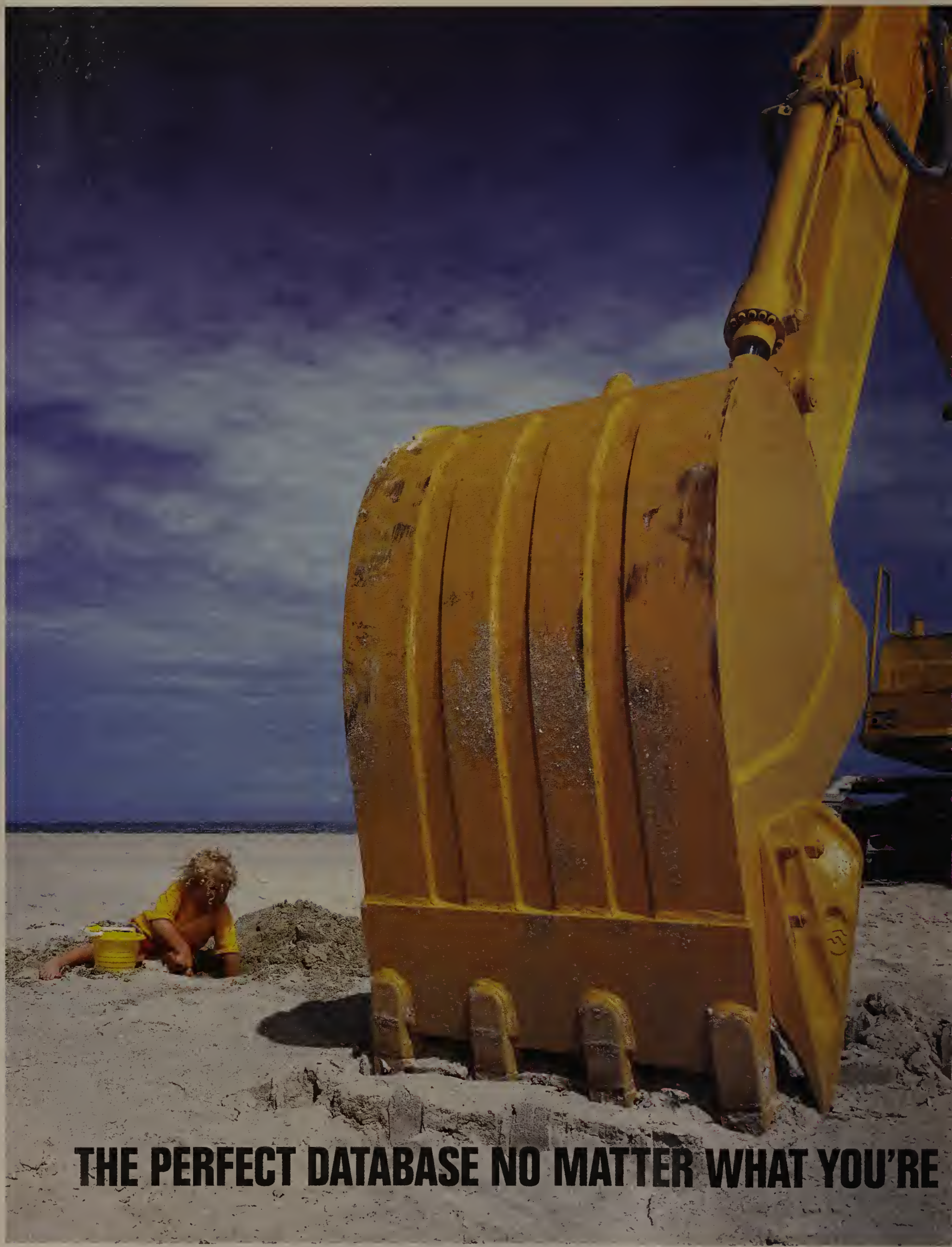
Contributing Editor David Coursey edits P.C. Letter. *He can be reached on PC World Online (see page 12 for contact information).*

LOOKING AHEAD

The more I use Collabra Share, an E-mail add-on that offers Lotus Notes–like conferencing capabilities, the more I like it. The best part is you don't have to have Share to participate in the conferences; regular E-mail (even MCI Mail) works fine...Watch for dramatically better sound and graphics support in 1995 desktop machines. Improvements in built-in multimedia have add-on card vendors scrambling to raise the ante and find new lines of business. Next year, expect to see "combo" cards, such as those combining a sound card with a fax-modem ...Software-based compression for video conferencing should reduce hardware requirements and system costs. Vivo is the first company to implement the international H.320 video teleconferencing standard in software. Intel has been promoting its own standard, used in its ProShare line, but inexpensive H.320 could bring real compatibility to video conferencing...Watch for Deluxe's (the check printing people) purchase of T/Maker to generate some cool printing-related software products.

By David Coursey

MICHELE CLEMENT



*Support for Microsoft Access is no-charge; however, normal telephone company charges apply. Microsoft support services are subject to Microsoft's then-current prices, terms and conditions, and are subject to change without notice. © 1994 Microsoft (800) 240-4782, Dept. 3HY. In Canada, call (800) 563-9048. Outside the United States and Canada, call your local Microsoft subsidiary or (206) 936-8661. Customers who are deaf or hard-of-hearing can reach Microsoft text telephone (TT/TDD) services and Microsoft Access are registered trademarks and IntelliSense and Rushmore are trademarks of Microsoft Corporation. Paradox is a trademark of Borland International, Inc.

Used to be the expression "powerful end-user database" was like "the Long Island Expressway" or "jumbo shrimp."

A contradiction in terms.

Of course, that was before the introduction of Microsoft Access® relational database system 2.0: the database that's as powerful as it is easy to operate.

Are you a seasoned developer? Or are you working with a database for the first time? As people are discovering, it's no longer an issue. Because with Microsoft Access, routine tasks are automatic. And complex tasks aren't complex at all.

Do you have to create a table for your data? Just click on the Table Wizard and you'll be led through the process step by step.

Have to add a functional button to a form? Use the Command Button Wizard. (Microsoft Access will even write the code for you.) Have to locate some hard-to-find data? Let the Query Wizard hunt it down. Have to set up a mail merge between Microsoft Access and Word? Click on – you guessed it – the Mail Merge Wizard.

What is it that makes this wonderful stuff so easy? Something we call IntelliSense™ technology: a feature unique to the Microsoft® Office family of programs, and one reason why Microsoft Access has garnered so much critical acclaim.

Suppose you're ready for something more adventurous. Like developing a database application of your own. Microsoft Access can help you do just that. Pose a query and its Rushmore™ query technology will provide an answer – not quickly, but immediately. Revise a piece of data and that revision will be reflected wherever your data is used – automatically. Plus, no matter where your data happens to be stored – Paradox™, Microsoft SQL Server™, you name it – with Microsoft Access you can, well, access it.

As if that weren't enough, even finding a helping hand is pretty easy. Microsoft Access comes with unlimited product support at no service charge.*

It adds up, clearly, to the first database that does everything you want – precisely the way you want to do it. And we find nothing contradictory about that. For the Microsoft retailer nearest you, call (800) 240-4782, Dept. 3HY.

Microsoft.Office

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THE ALL-PURPOSE PC:

Next year PCs will be easier to use and more versatile. They'll be communications and information centers, handling voice mail, E-mail, video conferencing, even home entertainment. Here's what's in store.

In 1995 the PC, like the rest of us, will be forced to perform more tasks than ever. Computers will also serve as telephone systems, video conferencing terminals, and home entertainment centers—they will be all-purpose information appliances. At the same time, new PCs will be easier to use, upgrade, and maintain. To accomplish all this, vendors are modifying systems inside and out. Inside the case, technologies such as Plug and Play will end upgrade headaches because peripherals will configure themselves without your assistance. Outside, communications technologies such as ISDN will make exotic applications like video conferencing and high-speed remote LAN access more affordable.

That's the promise, anyway. The reality may be slower to arrive, costlier when it does, and more complex than expected. Time will tell, but here's what vendors and analysts predict you'll be able to buy in the year that lies ahead.

The Business Desktop

The convergence of the PC and the telephone will spawn a key product category next year: the universal in-box. Instead of checking your phone for voice mail, your PC for E-mail, and your reception desk for faxes, you'll have a single PC-based in-box. To hear a phone message, click the appropriate icon and it will play back on your PC or telephone. The trick will be getting your LAN and office phone system to communicate. This will require new E-mail server software, currently under development by Microsoft and Lotus. You'll also need special voice-mail products. Octel Communications expects to ship such a device next year, according to Jerry McLeod, Octel

Business Desktop

By the first quarter of 1995, the business PC will include Plug and Play hardware and software ❶. By Q2 or Q3, you'll see low-cost video conferencing software ❷ and 17-inch monitors with built-in video cameras ❸. At year-end, look for systems with DMI support on 3GB hard drives ❹, 150-MHz Pentium processors ❺, and the universal in-box—one window for voice mail, E-mail, and fax ❻.

Edited by Russell Glitman

A LOOK AHEAD

director of strategic planning. With this product, adding fax and voice mail to your E-mail will require a dedicated PC server with Windows NT and special hardware and software. A system for 75 people should run about $16,000 including the PC server, plus another $50 per user.

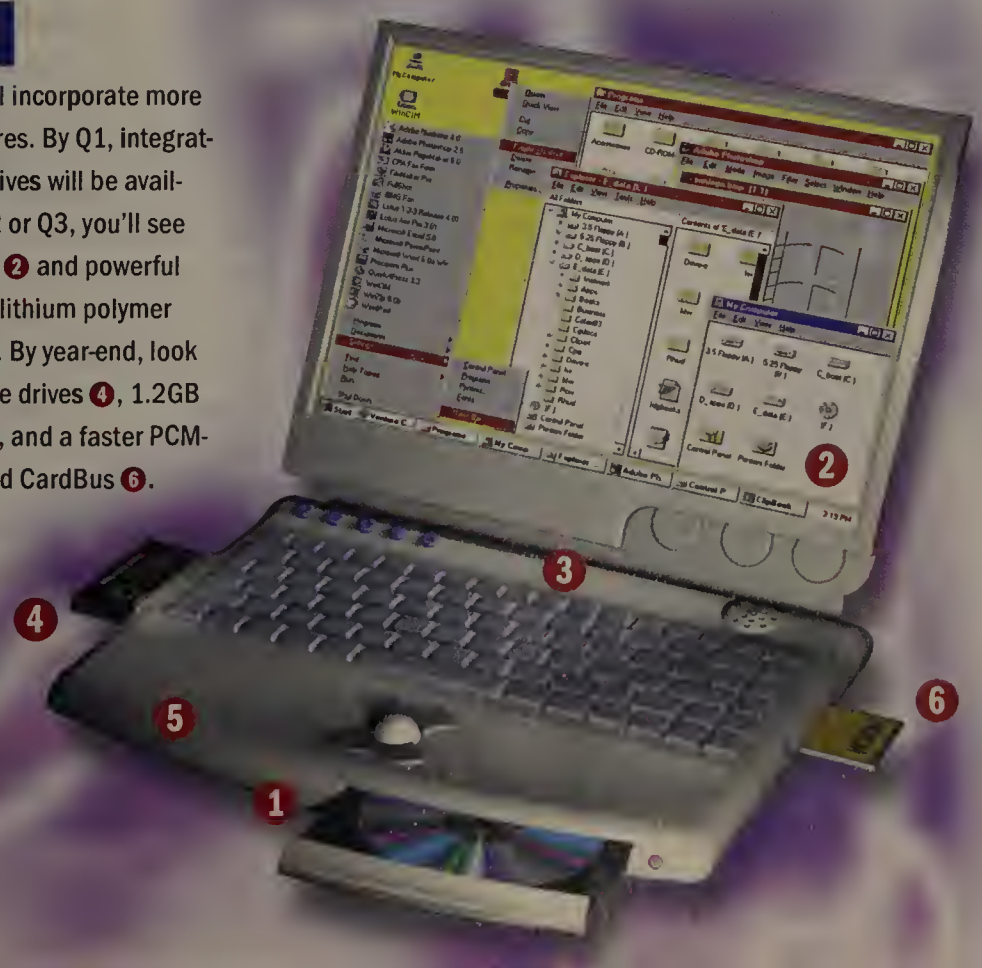
Desktop video conferencing will become more affordable in 1995 due to a technology called native signal processing, which will substitute software for the costly digital signal processing chips that currently populate video conferencing add-in boards, says David Schuler, marketing manager for Intel's PC Architecture Labs, a project codeveloper. This technology could reduce the prices of video conferencing products, which currently cost as much as $3000, by 50 percent, he says. But you'll need a 90-MHz or faster Pentium-class PC.

Early in 1995, even before Windows 95 is released, hardware supporting the Plug and Play standard will reach the market. Over the course of the year we'll see a progression of advances toward true Plug and Play, in which adding peripherals to your PC requires little more than plugging in the card and loading the driver software. Afterward your system automatically recognizes when the device is connected or removed.

End to Plug and Pray

The first step toward Plug and Play is coming from Intel, which is offering its Intel Configuration Utility and Configuration Manager software to hardware vendors. The utility works with PCI cards—which are Plug and Play by nature—and future Plug and Play ISA cards to identify conflicts, but you will still have to resolve them.

The ultimate Plug and Play will arrive in midyear with Windows 95. Vendors including DEC, Compaq, and AST are already selling Plug and Play PCs: The combination of such systems, future Plug and Play devices and add-in cards, and Windows 95 should make configuring systems as simple as connecting devices to your computer.



Portable PC

Notebooks will incorporate more desktop features. By Q1, integrated CD-ROM drives will be available ❶. By Q2 or Q3, you'll see larger screens ❷ and powerful batteries with lithium polymer technology ❸. By year-end, look for built-in tape drives ❹, 1.2GB hard drives ❺, and a faster PCMCIA drive called CardBus ❻.

News Monitor

CPUS BREAK SPEED LIMIT: In 1995 expect microprocessors with speeds of over 100 MHz. Intel is expected to introduce new P54C Pentium chips with speeds of up to 150 MHz, and Cyrix and AMD will unveil their Pentium competitors. The first systems using the 150-MHz Pentium will show up between September and November 1995, says Dean McCarron, a principal at Mercury Research. These machines will be servers and high-end desktops street priced in the $3500 to $5000 range, he says. Systems that use Cyrix's M1 chip will likely show up in spring 1995, followed by systems with AMD's K5 chip in the summer. The Cyrix and AMD chips reportedly run 10 to 30 percent faster than Pentium chips running at the same clock speed because they are designed to work on two instructions simultaneously. PCs that use the Cyrix and AMD chips will sell for $2500 to $3500 on the street, McCarron says.

MICROSOFT BUYS INTUIT: Software giant Microsoft tightened its mighty grip on the software market by an agreement in October for a $1.5 billion stock swap and merger with Intuit, maker of the Quicken personal finance program. Quicken is by far the most popular program in its category, estimated to control 80 percent of the market share. The transaction puts Microsoft in a strong position in the emerging business of electronic banking and online financial services. Having already faced antlcompetitiveness

(continued on page 55)

ILLUSTRATIONS: LEFT, JONAS HÖGLUND; ABOVE, COCO MASUDA

Top of the News

Plug and Play products should not cost much more than their non–Plug and Play counterparts, says IDC analyst Ted Julian.

A complementary technology called Desktop Management Interface (DMI) will make it easier for your company to manage PC resources, by tracking the hardware and software in use. It maintains an inventory file on your hard disk and can communicate with Plug and Play components. Vendors will create applications that let your computer support staff examine and record the contents of this file. As a result, staff could easily track which peripherals and software are in use, to simplify upgrading. DMI-compatible PCs could appear late this year, says Daniel Brown, product manager for Premmia desktops at AST.

Home PC

By first quarter 1995, the home PC will come together with all-in-one systems that include integrated 14-inch monitors with TV tuners ❶. Also look for easy-upgrade cases with pull-out upgrade trays and color-coded components ❷. By Q2, you'll see telecommuting PCs with high-speed ISDN hardware ❸. In Q3, look for Accessbus PCs and peripherals ❹. By year-end, quadruple-speed CD-ROM drives and 150-MHz Pentium-class CPUs from AMD, Cyrix, and NexGen will be the rage ❺.

One Port for All

Another Plug and Play technology will make it easier to add external peripherals and may one day replace several PC ports. Accessbus, which uses a connector that resembles a phone jack, lets you daisy-chain up to ten devices to a single port on your PC, according to Dan Wilnai, president of the Accessbus Industry Group. Those devices include low-speed peripherals such as mice, keyboards, and printers outputting documents with minimal graphics. Vendors including NEC and Logitech have demonstrated Accessbus peripherals. Desktops and notes with the technology are expected to hit the market in the spring. Accessbus devices should cost about the same as non-Accessbus products, Wilnai says.

Going Mobile

Next year PC vendors will cram more desktop features into portables. Subnotebooks and notebooks may merge into a single product category, says Randy Giusto, director of mobile computing at BIS Strategic Decisions. "[People] want a notebook that weighs under 5 pounds and is less than 1.5 inches thick," says Giusto. To create these, vendors will introduce lightweight products with full-size collapsible keyboards.

While notebooks shrink, displays will increase in size. Bruce Claflin, general manager of product and brand management at IBM's PC Company, expects to see products with 14-inch screens. Claflin says notebook vendors will expand the screen to the very edge of the notebook case.

QEMM 7.5 Gives Windows the Full Treatment:

Memory managers have long been a DOS-only affair. But Quarterdeck Office Systems' latest version of QEMM features a spiffy new Windows interface that lets you install, configure, and monitor the program without the mysteries of the C> prompt.

Popular QEMM utilities such as Qsetup (for tweaking your QEMM configuration) and Manifest (a system diagnostic tool) now have Windows front ends. Manifest also provides diagnostic information on IRQ channels and PCMCIA slots, and on memory usage by Windows and its programs. QEMM 7.5 also detects the memory addresses used by PCMCIA cards.

Like all memory managers, QEMM loads device drivers and memory-resident programs into the upper memory address of 640K to 1MB, freeing more RAM below 640K for DOS programs. QEMM 7.5 has a special feature for users of Stac Electronics' Stacker 4.0: QEMM reduces Stacker's driver to less than 10K of conventional RAM, according to Quarterdeck. A free driver from Stac is required.

QEMM 7.5 also helps DoubleSpace and DriveSpace users. Its Stealth D*Space feature moves the DoubleSpace or DriveSpace driver out of conventional or upper memory into extended memory, freeing between 31K and 49K of RAM. To test this, we loaded QEMM 7.5 on a notebook running DoubleSpace; it freed an additional 40K of conventional RAM, increasing the amount of available RAM from 577K to 617K. QEMM 7.5 lists for $99.95. Quarterdeck Office Systems, 800/354-3260, 310/392-9851. Reader service no. 693

LEFT: GORDON STUDER; ABOVE: JONAS HÖGLUND

Vendors will also increase battery life. A new lithium polymer battery offers the most promise and should be available by midyear, according to Brian Manser, director of product strategy for portable systems at Zenith Data Systems. This technology will up average battery life by about 50 percent and add another $100 to a notebook's price.

Multimedia and More

Early in the year, notebooks with multimedia capabilities will be common. Audio and telephony features will let them function as speakerphones or answering machines.

A faster PCMCIA technology known as CardBus will let you add high-performance peripherals such as video cards, fast hard disks, networking cards, and multimedia devices, including MPEG video playback cards. The current PCMCIA bus is 16 bits wide and plods along at 8 MHz. By contrast, CardBus is 32 bits wide and will zip along at up to 33 MHz. CardBus is expected to support existing PCMCIA cards. CardBus systems and peripherals should be available by the end of 1995, says Paul Sereiko, director of marketing at SystemSoft, a member of the PCMCIA board.

More Power to the Home

As telecommuting and flexible work arrangements become more common in 1995, more people will work away from the corporate office. The PC in the home office will have to run the same applications as the PC in the corporate cube. By year-end, expect some home PCs to have the same 120-MHz and 150-MHz Pentium-class CPUs that business systems will feature.

A high-speed digital phone service known as ISDN will make it faster and easier to run networked applications or retrieve E-mail from the corporate LAN. ISDN, offered by your local phone company, can pump data across a phone line at a rate of 128 kilobits per second (kbps), whereas modem and regular phone lines top out at 28.8 kbps. In 1995 local phone companies are expected to make ISDN available to 80 percent of their customers, according to Sanjay Mewada, an analyst at The Yankee Group. Phone companies also plan to slash prices for ISDN.

When you're ready to put your work aside, the home PC will be an entertainment center with integrated TV tuners, radio, and CD-ROM drives, and high-fidelity speakers. Accessbus will let you attach multiple keyboards, mice, and joysticks so more than one person can play a game.

Price Choppers

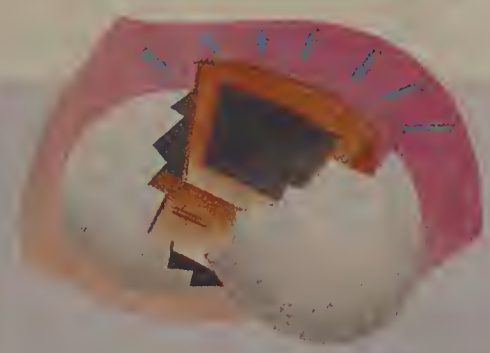
To keep prices low, systems that integrate the monitor into the CPU case will be prevalent, according to Rhoda Alexander, senior analyst at Stanford Resources.

HARNESSING THE PENTIUM for multimedia: David Schuler of Intel's PC Architecture Labs

Since support for home PCs is the buyer's responsibility, easy upgrading will be critical. Vendors may create modular cases with color-coded knobs and levers that make it easy to remove and replace components, says IDC's Ted Julian.

If all this seems far-fetched, think back to a year ago: The DX2-66 was the mainstream processor, CD-ROM drives were often an option, personal video teleconferencing didn't exist, and notebook hard drives maxed out at 340MB. Even in 1995, the one constant in computing will be change.

—Randy Ross



News Monitor

(continued from page 53)

charges from the Justice Department this year, Microsoft announced it will sell its finance program, Microsoft Money, to chief competitor Novell.

AND MICRON MOVES TO BUY ZEOS: Micron Technology wants to buy Zeos International for $405 million. The proposed deal will give Micron, whose systems frequently make it into the PC World Top 20, a shot at developing a notebook line and increasing brand awareness with the Zeos name.

AND U.S. ROBOTICS BUYS MEGAHERTZ: Two leaders in the modem market will now be one. The $217 million deal gives U.S. Robotics, long known for its desktop modems, an entrée into the booming portables market dominated by Megahertz.

FTC TACKLES CYBERFRAUD: The Federal Trade Commission is stepping up action against the growing number of shady ventures propagating through the online world. In September the FTC charged Brian Corzine (aka Brian Chase) of Sacramento, California, with making false claims about a credit repair program he advertised on America Online. "For just $99 we will show you how to create a brand-new credit file at all three of the major credit bureaus...100 percent legal and 200 percent guaranteed," stated the ad for Chase Consulting. The FTC says Corzine advised customers to give potential lenders false information, a violation of federal law. "As these computer networks continue to grow, we will not

(continued on page 57)

PHOTO: ROBBIE MCCLARAN; ILLUSTRATION: COCO MASUDA

Is It Time to Switch to IBM?

TEST DRIVE

IBM is recharging its line of desktop PCs and consolidating brands in an attempt to reinvigorate its corporate product line and reduce customer confusion over the endless permutations of ValuePoints, PS/2s, and Ambra systems. To simplify matters, IBM has pulled together its product development and customer support and launched a new, unified line: the Personal Computer 300 and 700 Series.

PC World test-drove a preproduction 90-MHz Pentium model of the 700 Series, one of IBM's "enhanced corporate" desktops (the others, 100-MHz and 75-MHz Pentiums, were not available). The results show respectable performance slightly above the average 90-MHz Pentium system scores. The 300 systems come with DX2-50, DX2-66, DX4-100, and Pentium-60 processors. Differences between the 300 line and 700 Series aren't related just to the CPU. The 700s also include built-in sound and parity checking—a fairly expensive form of memory error detection that many companies (including Compaq) leave out of lower-end systems. Prices on the 300 and 700 Series range from $1145 for an entry-level DX2-50 model with 4MB of RAM and a 270MB hard disk to $4208 for the 700 Series model that we tested.

Both the 700 and the 300 PCs offer advantages over past IBM systems. One big plus is the SelectaBus scheme, which lets you swap expansion buses just by changing a riser card that plugs into a special slot on all Personal Computer Series motherboards (expansion boards in turn plug horizontally into the riser card's slots). The 300s come standard with ISA bus slots, which can be upgraded for $100 to a mix of ISA and PCI or ISA and VL. You can also opt for the PCI version with the Pentium model for a $100 premium. With the 700 Series, you get a choice of ISA or Micro Channel systems that can be upgraded to a mix of PCI and ISA or PCI and MCA for $100.

One of the main attractions of both the 300 and the 700 Series is a software bundle dubbed EasyTools, a huge set of utilities

IBM Personal Computer 300 and 700 Series

The new mainstream IBM desktop line.
Key Features: CPUs from DX2-50 to Pentium-100 • 80MB tutorial and utilities bundle • Choice of five-slot, five-drive or three-slot, three-drive chassis • SelectaBus upgradable expansion bus • Business Audio standard in 700 Series
Pricing: $1145 to $4295
Availability: Immediate
IBM, 800/426-3333 information, 800/426-2968 direct sales

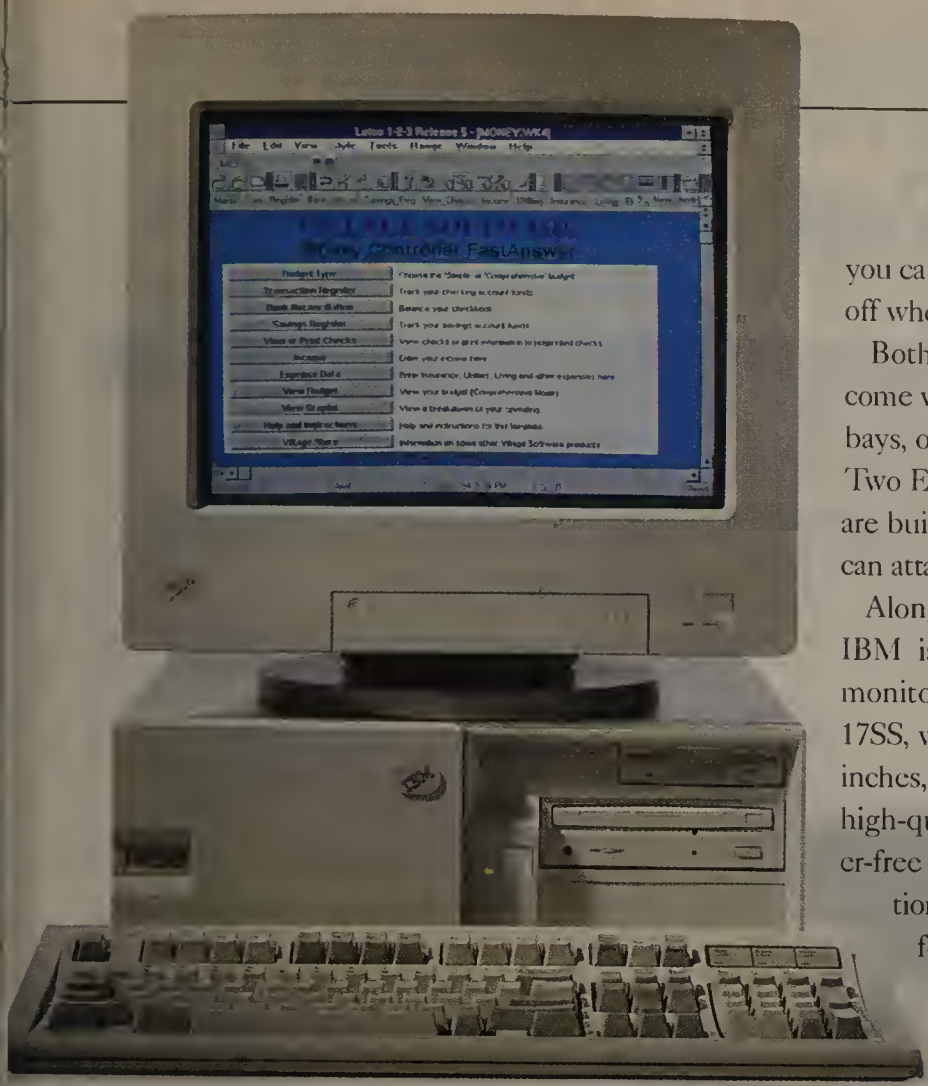
Compaq Presario, IBM Aptiva: Nice to Come Home to

The Compaq Presario and IBM Aptiva home PC lines both deliver ready-to-go solutions that offer no-fuss computing at a good price.

For easier navigating, the Presario sports an improved version of Compaq's Windows shell, TabWorks. I liked the new Media Pilot folder, from which you can fax, answer the phone, check voice mail, use your address book, or play audio CDs. The unobtrusive Presario 500 models (with monitor and CPU attached) come with 4MB of RAM—you'll want 8MB—and a 420MB hard drive. The 500s run on an AMD DX2-66 processor, not today's fastest (in fact, its performance scores were about 20 percent slower than the average for DX2-66s), but the chip helps keep prices low, $1699 to $1899. Compaq includes a double-speed CD-ROM drive, 16-bit sound, a speakerphone, and a 14.4-kbps fax-modem.

IBM's Aptivas deliver compelling convenience features and good performance. Scores for the system we tested were just a bit slower than the average score for DX2-66 PCs. An Aptiva can also turn itself on to take a voice message or to send or receive a fax, and then turn itself off. The Aptivas have multimedia features similar to the Presarios'. Aptivas range from an SX-33 with a 270MB hard drive to a 60-MHz Pentium machine with a 727MB drive; most have 8MB of RAM. Street prices are $1199 to $2599, not including a monitor. Weeks after the line was announced, it was sold out to dealers, so finding one may be tough.

—Laurianne McLaughlin



LIKE ALL MEMBERS of the new IBM Personal Computer line, this 90-MHz 700 model has a locking door to secure the floppy drives.

and online tutorials that comes preloaded along with DOS and Windows (or OS/2, if you prefer). The first time you turn on the system, a sort of electronic foyer called the Welcome Center offers cheery, interactive introductions to Windows (or OS/2), hardware basics, ergonomic computing tips, and so on, plus descriptions of all the utilities.

Much of the included software is worthwhile. You get QA Plus, an excellent diagnostics program, along with the AnyView utility, which lets you change Windows resolutions from standard VGA, to 800 by 600, to 1024 by 768, without rebooting. The Rapid Resume utility saves the contents of memory to disk before shutting down, so you can start up where you left off when you turn on your PC.

Both the 700s and the 300s come with three slots and three bays, or five slots and five bays. Two Enhanced IDE interfaces are built into every unit, so you can attach up to four hard disks.

Along with the new systems, IBM is introducing two new monitors—the 15P and the 17SS, which measure 15 and 17 inches, respectively. Both these high-quality units feature flicker-free operation at high resolutions (76 Hz at 1024 by 768 for the 15P and a whopping 77 Hz at 1280 by 1024 for the 17SS) and a crisp .27mm dot pitch; the 17SS adds built-in stereo speakers. The two monitors are list priced at $780 and $1410.

Another advantage to buying a Personal Computer 700 or 300 is IBM's customer support. You get a three-year warranty with a year of on-site service and two years of carry-in service covering parts and labor. Telephone support is available seven days a week, and IBM will perform diagnosis over phone lines using its Online Housecall remote communications program. IBM's new Personal Computers may not be the fastest or cheapest PCs, but they're more competitive than the usual IBM offerings, and they're backed by one of the most ambitious support programs ever.

—Eric Knorr

TEST REPORT

IBM's 700 Series, a Pentium-90 System, Moves Ahead of the Pack

System	Price	RAM (MB)	Cache (K)	Application test times
IBM 750-P90	$4208	16	1024	1:10 :33 1:04 :56
Average of nine P-90 systems	$3540	16	256	1:10 :35 1:05 1:07

Shorter times are better.

Minutes 0 1 2 3 4

Word 2.0 for Windows
Excel 4.0
Freelance 1.0 for Windows
Paradox 1.0 for Windows

IBM results based on tests of a preproduction system using PC World Test Center application benchmarks.

News Monitor

(continued from page 55)

tolerate the use of deceptive practices," says FTC chair Janet D. Steiger.

PENTIUM OVERDRIVE AT LAST: It's been a long time coming, but Intel's Pentium OverDrive processor will ship by the end of the year. That's the word from Intel representative Elizabeth Kemper, who says the Pentium OverDrive chip, which is based on 90-MHz and 100-MHz Pentium technology, should boost 486 performance to that of 60-MHz and 66-MHz Pentium systems. The 0.6-micron, 3.3-volt processor will fit in the 237- and 238-pin upgrade sockets found on many 486 motherboards, but not in the older 168-pin socket. However, "it's not safe to assume that just because you have a socket, the chip will work," Kemper says. Intel has identified more than 650 OverDrive-compatible systems. To find out if your PC is among them, you can call the manufacturer, the retailer who sold it to you, or Intel's fax-back service at 800/525-3019.

VIOLENCE AND NUDITY: Starting this fall, more and more computer games will begin to carry voluntary rating labels to inform consumers whether a game contains violence, nudity and sex, or harsh language—and to what degree. The labels are the result of a computer game rating system developed by the Recreational Software Advisory Council (RSAC), a nonprofit group formed by software vendors. The first game packages bearing RSAC labels will hit stores by November.

Edited by Randy Ross
Contributors: Joe Abernathy, Jeff Bertolucci, and Laurianne McLaughlin

PHOTOS: JOHN GREENLEIGH; ILLUSTRATION: COCO MASUDA

Toshiba's Speedy 75-MHz Pentium Notebook

TEST DRIVE It's time to move over, DX4. There's a new speed-demon chip for portable PCs: Intel's 75-MHz Pentium processor. Toshiba America is among the first vendors to ship a 75-MHz Pentium notebook—the 6.9-pound T4900CT—and sure enough, it's a doozy. Preliminary test scores from the PC World Test Center show this Pentium portable, with a super-fast 50-MHz bus, to be one of the fastest notebooks we've ever tested (see the Test Report).

The T4900CT carries a price that would make even Robin Leach blush: $7499. For that price, though, you get more than just a cutting-edge microprocessor; you also get a large 10.4-inch active-matrix color display, 16-bit stereo sound, an integrated microphone, 8MB of RAM, and a spacious 772MB (formatted) hard drive.

TEST REPORT

Toshiba's 75-MHz Pentium Notebook Speeds Past DX4s

System	Price	RAM (MB)	Application test times
Toshiba T4900CT notebook	$7499	8	1:18 :56 1:14 1:55
Average of seven DX4-100 notebooks	$3600	8	1:41 1:19 1:38 2:26

Shorter times are better.

Minutes 0 2 4 6 8

Toshiba results based on tests of a preproduction system using PC World Test Center application benchmarks.

Word 2.0 for Windows · Excel 4.0 · Freelance 1.0 for Windows · Paradox 1.0 for Windows

Intel's new 75-MHz Pentium is the first Pentium processor designed specifically for notebooks. The 3.3-volt chip runs cooler than its 5-volt 60-MHz and 66-MHz Pentium siblings. The 75-MHz Pentium is also less than half the size of other Pentium chips and uses a 50-MHz system bus—the fastest one yet for notebooks, which until now ran on either a 33-MHz or a 25-MHz system bus.

Like all Pentiums, the 75-MHz chip has a 16K cache. However, the T4900CT lacks a performance-boosting secondary cache—a standard feature on Pentium desktop PCs.

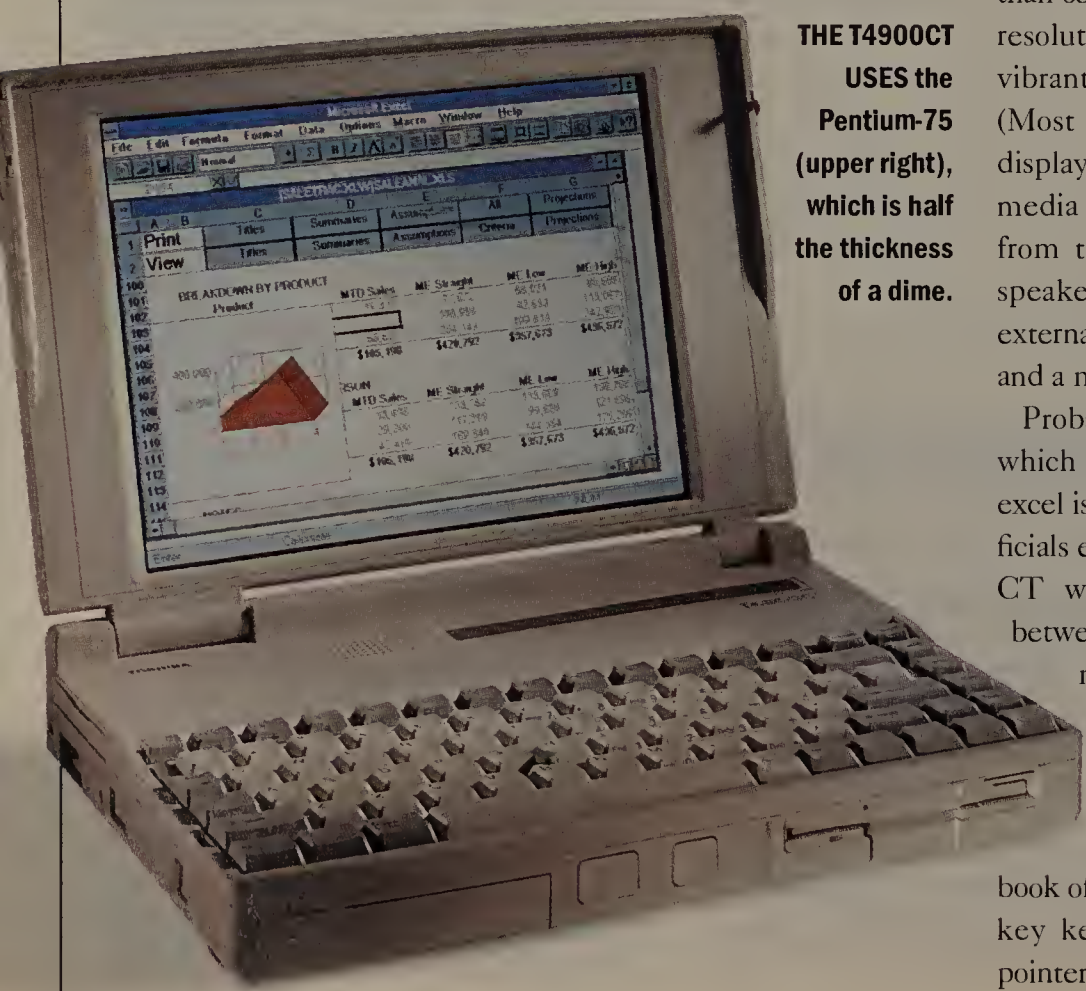
Toshiba's T4900CT note features one of the best color displays around. The 10.4-inch active-matrix screen shows more than 65,000 colors at 640 by 480 resolution, resulting in more vibrant, realistic color images. (Most color notebook screens display only 256 colors.) Multimedia users will also benefit from the T4900CT's built-in speaker and its connectors for external speakers, headphones, and a microphone.

Probably the only area in which the T4900CT doesn't excel is battery life. Toshiba officials estimate that the T4900-CT will run about 2 hours between charges. The nickel-metal-hydride battery recharges in about an hour and a half when the notebook is off.

The T4900CT notebook offers exactly the same 82-key keyboard and AccuPoint pointer that you'll find in Toshiba's high-end T4800 series. Other noteworthy features include separate PCMCIA Type II and Type III slots, as well as Plug and Play support.

Do you need a Pentium notebook? If you have limited portable computing needs—from dashing off business letters to answering your E-mail—probably not. But for multimedia presentations, video conferencing, computer-aided design, software development, and computer-based training, the Pentium-based T4900CT will put you in the fast lane.

—Jeff Bertolucci



THE T4900CT USES the Pentium-75 (upper right), which is half the thickness of a dime.

JOHN GREENLEIGH

Toshiba T4900CT

One of the first Pentium notebooks to hit the market.
Key Features: 75-MHz Pentium processor • 10.4-inch active-matrix color display that shows more than 65,000 colors • 16-bit audio
Pricing: $7499
Availability: End of November
Toshiba America Information Systems, 800/334-3445
Reader service no. 691

Do You Make These Six Common Mistakes On Your Taxes?

Six common mistakes can cause you big headaches on your taxes. An oversight here, an omission there. From unnecessary tax payments to full blown IRS audits—you can end up paying too much … or worse. But now, using TurboTax® or MacInTax®, you can avoid these simple but costly mistakes:

1 The Arithmetic Error
Today, even the simplest forms contain complex calculations. And with all the late-night scrambling, an innocent mistake could cost you plenty.

2 The Transcription Error
With all those numbers being juggled from schedule to schedule, it's no wonder the figures are so often transcribed incorrectly or entered on the wrong line.

3 The Omitted Form
Even "ordinary" returns require anywhere from six to a dozen forms to complete. It's easy to miss one or end up rushing all over town to find the one you need.

4 The Misinterpreted Instruction
At best, IRS instructions can be tough to understand. At worst they can be mind-boggling. What you need are clear directions in plain English.

5 The Overlooked Deduction
You'd have to be a professional tax preparer to know all the deductions you're entitled to. If you miss just one, it could cost you hundreds of dollars.

6 The Exceeded Guideline
The fastest way to trigger an IRS audit is to exceed the "normal" range on one of your deductions. You need to know what the IRS looks for on a line-by-line basis.

When you do your taxes with TurboTax, mistakes like these are virtually impossible. And filing your taxes couldn't be easier.

Macintosh DOS Windows

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TurboTax Quicken

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PC WORLD

More returns filed and more awards won than any other tax software. Over 40 million returns have been filed using TurboTax, making it the nation's most trusted tax preparation program. So order today. And see for yourself why the new TurboTax is easily the best tax software ever!

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New OS/2 Warp Gives You Win 95 Now

TEST DRIVE

Windows 95 (aka Chicago) still isn't here, but now we know what it looks like—and it looks remarkably like the new OS/2.

OS/2 Warp 3 reduces memory requirements to 4MB, improves performance dramatically, and introduces power management and hot-swappable PCMCIA services.

I found that the beta of OS/2 still isn't as fast as Windows 3.11, but it's doing more under the hood. For instance, Warp offers better crash protection for 16-bit Windows applications than does Windows 95. It isolates each 16-bit Windows application in memory, whereas Windows 95 places such applications in a shared virtual memory space. If one crashes, they all crash.

There are also look-and-feel enhancements, including LaunchPad, which provides one-button access to applications, disk drives, and printers and helps keep your desktop clean. There's a suite of software tools for the small office and home office, advanced multimedia support, and an "information highway on-ramp" that knocks the socks off a vaguely comparable feature in Windows 95 and Windows NT 3.5.

The new IBM Works package includes a word processor, a database, a spreadsheet program, a graphics package, a report writer, and a personal information manager.

But the gold in Warp is its built-in communications, the best of any operating system. To some, its Internet connections for OS/2 will be the most compelling new feature. Bundled on the desktop, this set of applications lets you browse files on the Internet, exchange E-mail, log in remotely to other computers (telnet), explore the Internet's file libraries (Gopher), or read Usenet, the collection of thousands of special interest discussion groups that represent "news" on the Internet.

Warp is seamlessly compatible with Windows 3.1 and 3.11 and Windows for Workgroups 3.11, one of which must be present if you want to run Windows applications.

—Joe Abernathy

How OS/2 Warp 3, Windows 95, and Windows NT 3.5 Stack Up

● Yes ○ No	OS/2 Warp 3	Windows 95	Windows NT 3.5
32-bit processing	●	●	●
Multitasking	●	●	●
Multithreading	●	●	●
TCP/IP (Internet connectivity)	●	●	●
Internet tools (mail, file transfer, Gopher)	●	○	○
Business software bundle	●	●	○
Minimum memory requirement	4MB	4MB	12MB
Object-oriented work environment	●	●	○
Availability	immediate	1995	immediate

OS/2 Warp 3

IBM launches an assault on Windows 95.
Key Features: Better looks and performance • Extensive business software bundle • Outstanding communications capabilities
Pricing: Under $80 on the street
Availability: Immediate
IBM, 800/342-6672

OS/2 Business Software Selection Continues to Grow

The primary small-business objection to OS/2—the lack of true peer-to-peer networking for file and printer sharing—is resolved with the introduction of LANtastic for OS/2. The product is the latest in a growing array of third-party software for OS/2. The OS/2 version proved easy to install and as user-friendly as the Windows versions.

With a base of users expected by some accounts to reach about 10 million by the end of 1994, OS/2 is finally a large enough target to attract software developers. And the prices of OS/2 applications are at last falling into the range of typical Windows applications.

While the pace of development still trails that for Windows, more than 2000 OS/2 applications are available. They include OS/2 versions of such Windows hallmarks as Lotus SmartSuite, Lotus cc:Mail, WordPerfect 6.0a, and CorelDraw.

Among the unique new OS/2 applications, consider the Mesa 2 spreadsheet. Besides including features typical of all current spreadsheets, Mesa 2 builds on the object-oriented nature of OS/2 to give you features such as cell inheritance in workbook design.

Most common business tools are available in OS/2 applications as well. They include GammaTech Utilities 2.1 (the Norton of OS/2) and Relish 2.12, a time manager and personal organizer.

New or Coming Soon to an OS/2 Near You

Product	Category	Purpose	Vendor
Imp OS/2	imaging	photo capture, editing	Compart
LANtastic	peer network	printer, file sharing	Artisoft
Mesa 2	spreadsheet	business	Athena Design
SmartSuite	office suite	business	Lotus
Xact	graphics	business, publishing	SciLab

Source: Buck Bohac, president, Indelible Blue

We Mean Business.

Price and performance are key factors when making business buying decisions. Perhaps that explains why Corporate 1000 companies are making the move to the ViewSonic 15G monitor. This new 15" monitor (13.9" diagonal viewable area) is an extraordinary value with features normally available only on large, expensive models.

Talking about business, we developed this 15" monitor to be *the* answer for your display requirements. The multifrequency ViewSonic 15G features a flat square screen, a fine 0.28mm dot pitch and special coating to reduce glare and reflection. It also has a unique digital control system which adjusts screen size, position and geometry. Plus, it offers a special tilt control to precisely align the image, and our ViewMatch™ for matching screen color to printer output.

Combining its intense colors and sharp, crisp images, this high performance monitor also delivers resolution up to 1,280 x 1,024. Your employees will appreciate the superb quality of the monitor, while your accountant will appreciate the price!

In keeping with today's concern for the environment, the ViewSonic 15G is both low radiation MPR-II and EPA Energy Star compliant. This monitor powers down to under 5 watts when inactive, which saves energy and lowers your electric bill.

Successful business people are savvy buyers – that's why they're rushing out to buy the ViewSonic 15G . . . they See The Difference!

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ViewSonic 17 | ViewSonic 17 | July 1993 | ViewSonic 21 | April 1994 | ViewSonic 17 | January 1994 ViewSonic 17 | Finalist ViewSonic 17

Circle 224 on reader service card

Congress Exits From the Infobahn Debate

Contorted by demands from lobbyists for the communications industry and deadlocked by partisan politics, the landmark information highway initiative was killed in the waning days of the 103rd Congress.

The battle over Senate Bill 1822, the Communications Act of 1994, also reveals a Congress struggling to craft legislation that, if passed, would have been at odds with the desires of 8751 *PC World* readers who responded last summer to a survey on how best to shape the information highway.

The bill's death came after a version passed the House with only three nay votes. It was ready for a vote by the Senate when it was withdrawn by its Senate sponsor, Sen. Ernest F. Hollings, D-S.C., who blamed demands by the Baby Bells and political maneuvering by Senate Minority Leader Bob Dole, R-Kans.

From the outset, the Communications Act was a battleground for special interest spending and political infighting. Designed to provide the financial incentives to build the information highway by deregulating the telephone, cable, media, and entertainment industries, the legislation would have reshaped the landscape of the $150 billion industry.

Lobbyists and political action committees for the affected industries reacted with startling enthusiasm to the opportunity. As reported in "Highway Robbery: Selling the Net" (*Top of the News*, May 1994), money for reelection bids and such "soft money" intangibles as golf tournaments was being funneled to key politicians. During the 1992 election cycle, the communications lobby gave $5,684,886 to members of the five Senate and House committees with jurisdiction over the Communications Act.

While these gifts and contributions are legal, they bought influence and won dramatic concessions, according to Washington public interest advocates. Many of these

How to Build the Infobahn

Leading responses to our survey

Percent of respondents ▼

What should government's role be in regulating the information highway?	
Ensure that illegal activities are not conducted	28
Define and protect First Amendment rights	21
What mechanism should government install to regulate the information highway?	
A committee of corporate and public interest leaders to oversee development	35
A federal commission, similar to the FCC, to oversee operations	27
What access should be provided free on the information highway?	
Communication with federal officials and access to federal resources	22
Communication with local and state officials	21
What is the best way to fund universal access?	
A tax deduction for commercial providers that provide public access	29
A user tax on services, similar to sales tax	22
Should the government mandate all network providers set aside bandwidth for public and civic activities?	
Yes	60
No	40
Should the government be allowed to limit the use of encryption on the network?	
Yes	31
No	69

Source: fax survey from June 1994 PC World

Respondents were asked to mark all answers that applied for multiple-answer questions.

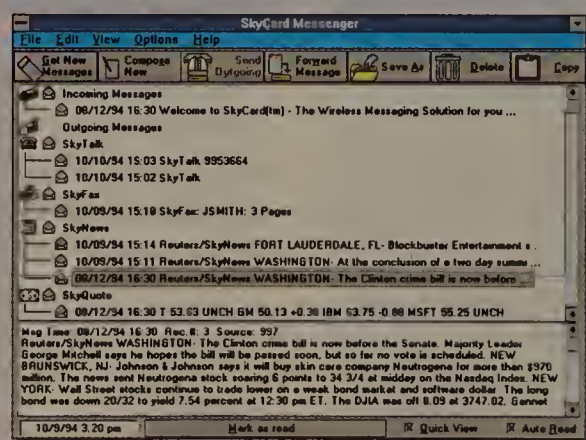
A Pager for Your Notebook:

SkyTel's SkyCard, the PCMCIA card touted as the next step in wireless messaging services, is both a relief and a burden. I like it because wherever I go, I'm connected. That's also what I hate.

SkyTel is a leading provider of wireless messaging services, and the SkyCard works on the same principle as a pager, combined with more elaborate mobile computing hardware and software to allow the receipt of formatted text messages, faxes, voice-mail notification, the Reuters news headline service, and financial information.

Here are the pros and cons. It's fantastic to have messages automatically routed to the different mailboxes I've set up on my notebook. Up-to-the-minute stock quotes and news headlines can be sent directly to specific Windows applications—such as Microsoft Excel and Word—sans a modem. The text is formatted, and I can even get charts.

Unfortunately, I can't tell at a glance who, or what, is trying to reach me. The SkyCard has no built-in LCD screen.



The SkyCard lists for $249 ($15.95 a month in a lease plan) and comes with a suite of software. The product can hold up to 128K of information in its AAA-battery-powered memory and accepts messages of up to 240 characters each (these can be strung together to create longer messages). The SkyCard requires a PCMCIA Type II slot to retrieve messages. SkyTel Corp., 800/759-9779. Reader service no. 692

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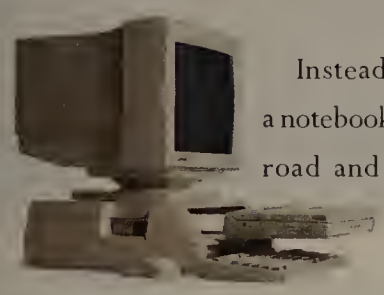
Think Of It As A Powerful On-Road/Off-Road Vehicle.



The optional SmartStation, coupled with an optional Compaq monitor and keyboard, makes it easy to use your LTE Elite as your desktop PC.

Instead of buying a notebook PC for the road and a desktop PC for your desk, now you can buy a Compaq LTE Elite™ 4/40CX. It's a high-performance notebook with plenty of power (and fewer total pounds) for the road. And our optional SmartStation™ lets your LTE Elite perform double duty as your desktop PC. LTE Elite has such convenient features as a built-in AC Adapter, Enhanced EasyPoint™ Trackball, removable hard drive, PCMCIA slots and, of course, our comprehensive Compaq 3-Year Warranty.†

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OCTOBER '94
LTE ELITE
4/75 CX

Circle 83 on reader service card

concessions represent a viewpoint opposed to that expressed by *PC World* readers who responded to our June fax-back survey.

For instance, of the 8751 respondents, almost 90 percent were in favor of providing some form of free public access. While the House agreed, specifying the construction of an "interoperable," open network, the Senate changed this word to "interconnected," and shifted the definition of the information highway from one of an open public network to a series of private interconnected networks, each of which would levy a toll on passing traffic, according to Andrew Maisel, director of open systems technology for Sun Microsystems. The change was made after intense lobbying by Microsoft, Apple, and IBM, Maisel says. All three of these companies are developing new commercial data networks.

"These people want to own a private toll road and charge access fees," says Maisel, who led an effort to block the move.

Only 1163, or less than 14 percent, of the 8521 respondents to a question on the government's role in regulating the highway were against any government involvement. However, the Senate took the opposite tack and planned to reduce the Federal Communications Commission's authority over the infobahn.

While most of the *PC World* respondents favored a tax or tax deduction to build a fund to ensure public access, the fund was eventually removed from the Senate bill.

Both Hollings and Dole plan to introduce new information highway legislation when the 104th Congress convenes.

—Joe Abernathy

SIDESWIPED: Sen. Ernest F. Hollings, D-S.C., withdrew the Communications Act of 1994.

Power Mac Proves No Contest for Pentium PC

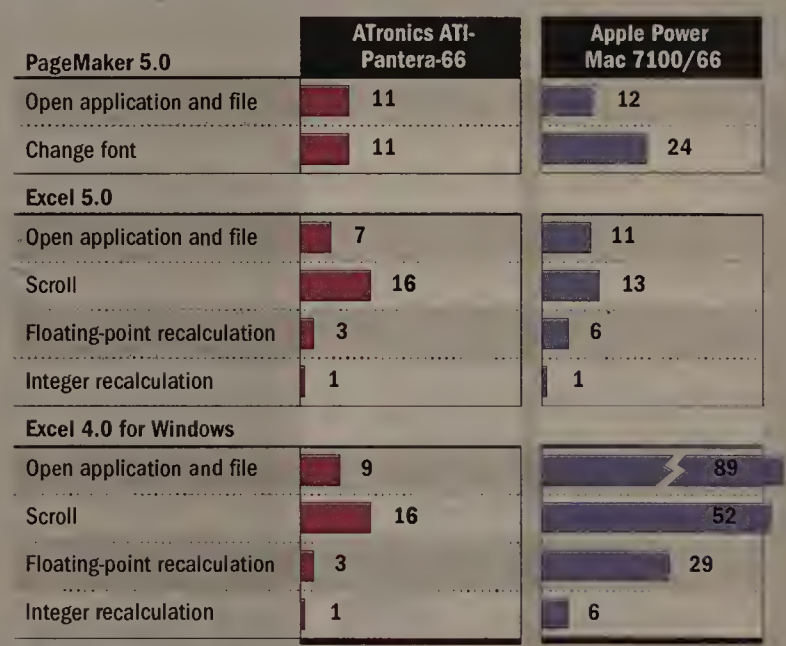
We'd always looked down on Macs, finding them underpowered and overpriced. Motorola's PowerPC chip, the engine in Apple's new Power Macs, gave us pause. It looked as though buying a Mac, gulp, might make sense at last.

The true measure of a system is how it runs applications. Two familiar programs, specially compiled to run on the Power Mac, are now available: Excel 5.0 and PageMaker 5.0. In collaboration with our sister magazine *Macworld*, we decided to determine which platform had the best performance for the price by running Excel and PageMaker benchmarks on both an Apple Power Mac 7100/66 using a 66-MHz 601 PowerPC chip and a generic 66-MHz Pentium system, the ATronics ATI-Pantera-66.

But we didn't stop there. After seeing the Power Mac TV ad, where a Mac user confidently pops a Power Mac into Windows emulation mode so the unwitting boss can use a Windows file, we decided to test that mode, by running a benchmark using the Windows version of Excel 4.0. When the last drop of sweat evaporated from our test technicians' brows, the results were clear: PC chauvinists can keep smirking.

TEST REPORT

Lower-Priced Pentium Bests Power Mac



Time in seconds. Shorter times are better.

Tests performed by PC World and Macworld using native versions of applications and basic hardware configurations, except for Excel 4.0, which used emulation on the Mac.

Configurations:

Apple Power Mac 7100/66: 66-MHz PowerPC 601 CPU, 24MB of RAM, no secondary cache, SCSI disk adapter, standard video controller, 1MB of video RAM, 16-bit color (640 by 480 resolution), System 7.1.

ATronics ATI-Pantera-66: 66-MHz Pentium CPU, 24MB of RAM, 256K secondary cache, PCI disk adapter, PCI video controller, 2MB of video RAM, 16-bit color (1024 by 768 resolution), DOS 6.22, Windows 3.11.

Did we mention price? At press time, the average 66-MHz Pentium with 24MB of RAM, a 340MB-to-500MB hard disk, a 256K secondary memory cache, a monitor, and a 2MB Windows accelerator was selling for about $3000 on the street (the ATronics PC lists for $2663). With no secondary memory cache and with 24MB of RAM, a 250MB hard disk, and 512K of video memory, the street price for the Power Mac 7100/66 ran $3420.

We tested the machine as is—without a secondary memory cache and with 1MB of video memory—to keep the price comparison more favorable for the Power Mac. Upgrading to match the tested Pentium PC would have added $438 more to the price of the system.

These test results do not bode well for future PowerPC machines from IBM and Motorola. True, these systems will be running NT or IBM's Workplace OS, which may deliver better performance than the Mac's System 7.1.

—Eric Knorr

TERRY ASHE/GAMMA LIAISON

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COLOR LASER COPIER 800

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EPSON

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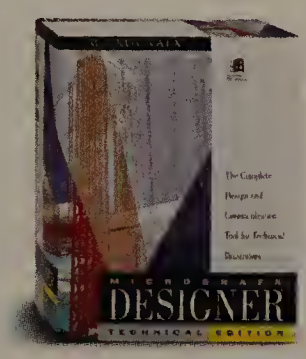

Pass your files to and from your CAD system with ease *and* reliability. Design with precision as tight as 1µ. Create eye-popping presentations and detailed documentation. And do it all in a *fraction* of the time you're spending now. Hard to believe? Then call us on it. **1-800-844-7118.** We'll send you a 30-day trial copy on CD-ROM. *Free.** We've also got a fantastic deal for those of you who own an earlier version of Designer. ***Micrografx Designer 4.1 Technical Edition.*** Don't do CAD without it.

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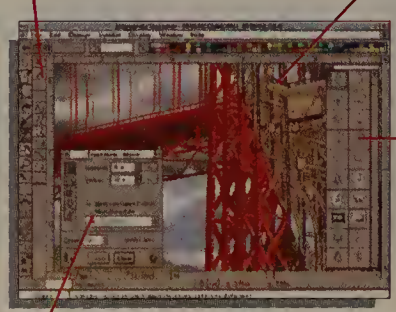

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Circle 183 on reader service card

AT&T's Globalyst PC Is Your Home Office Receptionist

When you work in a home office, it's not unusual for your executive suite to double as a laundry room—or for your business partner to double as your spouse. AT&T's Globalyst 360TPC is a home office PC that aims to be equally versatile, handling tasks ranging from business applications to education and entertainment software. Thanks to its telephony features—similar to those offered by home office systems from Compaq and IBM—the 360TPC can also serve as a tireless receptionist that answers the phone, screens calls, and routes voice messages and faxes to the right person.

While the 360TPC's $1899 list price doesn't include a monitor, the system is otherwise ready for serious work (and play) right out of the box. A 66-MHz 486DX2 minitower, it comes with 8MB of RAM expandable to 64MB, a 420MB IDE hard disk, a 3½-inch floppy drive, a Sony double-speed CD-ROM drive, and a VESA local bus graphics card with 1MB of RAM. The one area where you might accuse AT&T of cutting corners is in secondary cache memory: The Globalyst base model doesn't include any, although you can add as much as 256K.

Communications Collaborator

Things really start to get interesting with the 360TPC's 32-bit digital signal processor (DSP) technology. A single expansion card combines a fax-modem (14.4 kbps for fax, 19.2 kbps for data), 16-bit wave-table sound, a CD-ROM interface, and a joystick port. Along with the two external loudspeakers (one of which includes an integrated microphone) and the bundled Multimedia Connect software, this communications card gives the Globalyst multimedia features and the ability to perform as a combination digital answering machine and speakerphone.

Multimedia Connect detects whether incoming calls are voice or fax transmissions and handles them appropriately. When you're not around to answer the phone, callers hear a recorded greeting and can leave messages. The software displays both voice and fax messages in one easy-to-use on-screen mailbox. The program's advanced features let you set up mailboxes for multiple users or have the system automatically forward messages to another telephone number.

I tested a prerelease 360TPC, and the phone features displayed a few rough edges. For example, the system occasionally failed to recognize when I had hung up the phone, and thought completed calls were still in progress. The speakerphone also proved disappointing: Since there's no obvious way to tell which loudspeaker holds the integrated microphone, it's easy to accidentally speak into the wrong one.

More significant, while the phone's full-duplex design lets both parties speak and listen at the same time, the audio quality was poor even by speakerphone standards. I inevitably had to begin conversations by explaining why I sounded like I was underwater, and callers sometimes heard feedback when we spoke simultaneously. Fortunately, you can use an ordinary telephone for voice conversations—simply plug it into the communications card.

Bountiful Bundle

Beyond its communications abilities, the 360TPC comes with an unusually diverse selection of preinstalled software, including PFS:WindowWorks, Quicken, Sidekick, and a national telephone directory on CD-ROM. You also get a fun assortment of home-oriented multimedia packages.

If the bundled software has an obvious gap, it's the lack of a full-featured fax program such as WinFax Pro to complement the relatively basic fax features built into Multimedia Connect. Even so, the 360TPC provides home office users with a well-rounded assemblage of hardware and software, at a price that won't make you feel like you paid too much for too little.

—Harry McCracken

Globalyst 360TPC

MULTIMEDIA **Home office PC with phone features and a cornucopia of software.**

AT&T Global Information Solutions

800/746-4722

List price: $1899

Reader service no. 848

COMPUTERIZED MESSAGE CENTER: AT&T's Globalyst 360TPC can work as a combination digital answering machine and speakerphone.

LCD Panels Cast a New Light on Presentations

Those old-fashioned overhead projectors are still the mainstay of business presentations. They're simple and inexpensive, and they get the job done. But while the projectors haven't changed in years, the computerized LCD projection panels that fit on top of them have some amazing new features. Cases in point: new LCD panels from Sharp and Proxima that produce high-quality color images. With prices ranging from $4995 to $6695, these panels aren't cheap, but if presentations are your bread and butter, they can make quite an impression on an audience.

Sharp's QA-1500 uses an 8.4-inch screen and provides standard VGA resolution at up to 1.7 million colors. But its unique feature is that it can run a presentation without being connected to a PC. Simply plug an optional 105MB hard disk ($550 list price) into the QA-1500's PCMCIA Type III slot, download your files from a PC, and carry your entire presentation in a convenient 5.5-pound package. The QA-1500 fits easily in your briefcase and includes a full-function remote control.

Proxima has added three new LCD panels to its high-resolution Ovation Plus series. The 840, 842, and 846 panels offer 800 by 600 resolution with 16.8 million colors. The 840 is designed for text and graphics only, while the 842 and 846 can handle full-motion video. The 840 and 842 have 8.4-inch screens; the 846's is a 9.4 inch. The line's LightBoard feature lets you use a mouse or other pointing device to draw and write on the projected image.

—Stan Miastkowski

SHARP'S QA-1500 color LCD projection panel features an 8.4-inch screen.

QA-1500

1.7-million-color LCD panel.
Sharp Electronics
201/529-8731
List price: $5795
Reader service no. 849

Ovation Plus series

16.8-million-color panels.
Proxima Corp.
800/447-7694
List price: 840 $4995, 842 $5695, 846 $6695
Reader service no. 850

NEC Notebook Displays a Galaxy of Color

NEC just set a new standard for notebook displays: Its new Versa Vision True Color, a member of NEC's Versa M series, is the first notebook with a 24-bit, true-color display—an essential feature for viewing photorealistic images. While most active-matrix screens support only 256 colors at 640 by 480 resolution, the Versa Vision screen supports up to 16.8 million. And this 7.3-pound notebook also features an innovative design, a powerful Intel DX4 processor, and impressive storage capacity.

Of course, not every notebook user needs a gazillion colors. For basic word processing and spreadsheet chores, a 256-color display is good enough. But if you use a portable computer to do image editing, desktop publishing, animation, video, or other graphics-intensive tasks, the Versa Vision may be for you.

But this notebook saps power. According to NEC, the Versa Vision runs 1½ to 3 hours on one battery in 24-bit color mode, or twice as long with an optional extra battery pack.

If you'd rather have higher resolution than more colors, NEC also sells a Versa M model with an 800 by 600, 256-color LCD screen. Handy for spreadsheets, this active-matrix display shows 50 percent more of your work than does a 640 by 480 screen. Other screen options include a 640 by 480 active-matrix or passive color display capable of showing up to 65,000 colors. The 800 by 600 (256-color) and 640 by 480 (65,000-color) models run from 2½ to 5 hours. All the screens measure 9.5 inches diagonally and are removable and reversible (to face the audience during presentations).

Featuring a 75-MHz or 100-MHz DX4 processor and local bus graphics, the Versa M models continue NEC's tradition of modular notebook design. You can replace the floppy drive with an extra battery pack, a PCMCIA slot that accepts one Type III or two Type II cards, or NEC's Video Pak device for receiving video from a TV or VCR. The Versa M PCs come with 8MB of RAM upgradable to 40MB and hard drives ranging from 250MB to 810MB.

NEC's multimedia docking station, slated for release in late December or January, will include a CD-ROM drive and four Altec Lansing speakers.

According to NEC, street prices for the Versa M series will range from $5399 to $6159 for 24-bit color, $5899 to $6799 for 800 by 600 resolution, $5099 to $6399 for 16-bit active-matrix color, and $3949 to $4129 for 16-bit passive color.

—Laurianne McLaughlin

Versa M series

Notebooks with vibrant color screens.
NEC Technologies
800/632-4636
Street price: $3949 to $6799
Reader service no. 851

WHEN

Hey, if you weren't intelligent, you wouldn't have that important job of yours.
And it's always good to have a color printer that can keep up with your ideas.

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That's where the QMS® *magicolor* Laser Printer comes in.
It has the brains to keep you and your entire workgroup ahead of the competition.

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IT'S LIKE YOUR FAVO
JUST CAME BACK

Really, the way the Microsoft® Natural Keyboard™ fits you, it would be more accurate to ask you to try it on than to try it out.

What we have here is an entirely new kind of keyboard – a design that fits you

like your most comfortable clothes. And promotes a more natural posture for comfortable computing.

But there's much more to say about this keyboard. After all, it's the result of extensive ergonomic and usability research.

We started by watching how people work, taking note of their natural body positions. How they type. And how they use Windows.™

Our findings, to be honest, were incredibly enlightening.

We discovered there's a lot of room for improvement in the standard typewriter-keyboard. And that it could fit today's computer environment better than it currently does.

So we proceeded with a redesign. The result? A responsibly designed, split-keypad, gently

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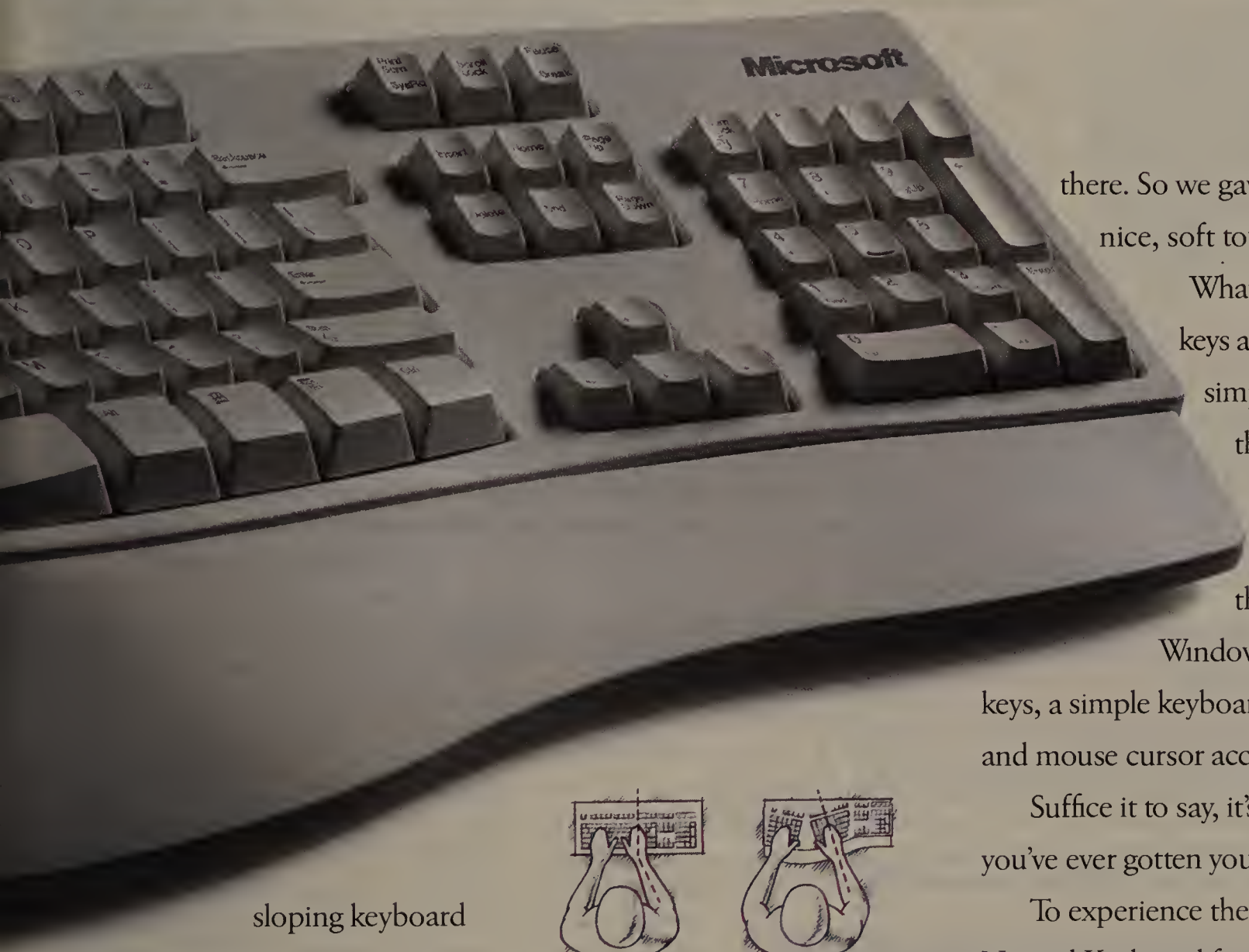
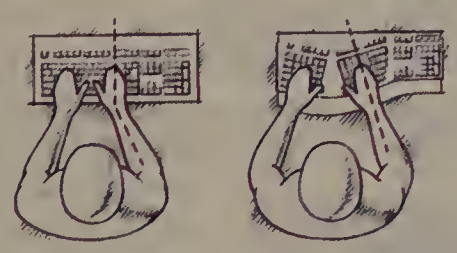
RITE PAIR OF JEANS AS A KEYBOARD.



sloping keyboard that fits more closely to the natural positions of your hands and wrists. And one that is more comfortable, if a bit odd-looking.

With this innovative new design, we were able to encourage a straighter positioning of the wrist. Which helps to relax the



The Microsoft Natural Keyboard fits you, not the other way around.

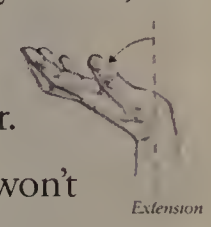
forearm. Which then helps to relax the shoulder. All of which makes for a more natural typing position.

And then we priced the Natural Keyboard to fit your budget just as well as it fits your hands.

But we simply couldn't stop there. So we gave the keys a nice, soft touch and feel. What's more, new keys and software simplify access to the Windows operating system. Like three new Windows function keys, a simple keyboard manager and mouse cursor accelerators.

Suffice it to say, it's like nothing you've ever gotten your hands on.

To experience the Microsoft Natural Keyboard for yourself, simply pay a visit to your local computer retailer. And slip one on. You won't believe how comfortable it feels.



And you won't even have to wait for a dressing room.

Microsoft

deaf or hard-of-hearing can reach Microsoft text telephone (TT/TDD) services at (800) 892-5234 in the United States or (905) 568-9641 in Canada. Microsoft and the Windows logo are registered trademarks and Natural Keyboard and Windows are

Logitech MouseMan: Better Fit, Wild Designs

Leave it to Logitech to make a statement about ergonomics and aesthetics at the same time. Highly regarded as an input-device innovator, Logitech has unleashed the latest MouseMan pointer, which features an improved ergonomic design and a unique teardrop shape. And if you're ready to make a fashion statement on the desktop, Logitech's wild and crazy MouseMan Sensa collection offers the same ergonomic enhancements in a variety of patterned casings.

The new MouseMan pointer has three buttons, each indented to position your fingers better, plus a shallow depression on the left for your thumb. Lefties beware: This MouseMan is available only with a right-handed orientation (Logitech will continue to sell the previous design). It also comes only with a serial or a PS/2 connection.

The MouseWare utility lets you change button functions, cursor speed, and other mouse characteristics. Handy dropdown menus list the functions you can assign to each button, such as cutting or pasting text, minimizing or maximizing windows, or calling up the Windows Task list.

The MouseMan Sensas come in four flavors: Deep Wood, Black Chess, Silver Pearl, and Blue Leopard. These new mice provide an inexpensive—and possibly more comfortable—way to express your individuality on the desktop.

—Melissa Riofrio

MouseMan, MouseMan Sensa

Ergonomic mice, some with outrageous designs.
Logitech Inc.
800/231-7717
List price: MouseMan $64.95, MouseMan Sensa $74.95
Reader service no. 852

RAD RODENTS: Logitech's new MouseMan design features a teardrop shape, and the Sensa models (shown here) are fashion aware.

Sony's Magic Link Communicator Is Built for E-Mail

Sony's new Magic Link PIC-1000 is a 1.2-pound PC designed for traveling executives, salespeople, and other E-mail junkies. Small enough to cradle in your hand, the Magic Link features a reflective LCD touch screen, 512K of RAM, and General Magic's innovative Magic Cap operating system. You use a stylus or your fingertips to navigate Magic Cap's series of desktops, rooms, and a village square—all providing fast access to major features.

Magic Link's integrated fax-modem (2400 bps for data, 9600 bps for fax) lets you perform basic communications tasks such as sending and receiving faxes, or transmitting E-mail via the AT&T PersonaLink or America Online services. (Sony plans to support additional online services in the future.) The device includes a PCMCIA Type II slot for an additional peripheral such as a one-way paging card for receiving messages, or a 1MB SRAM card. One particularly innovative option is the $79.95 telephone headset that plugs into Magic Link's telecom connector.

While the $995 Magic Link is primarily intended as a communications device, it includes several ROM-based applets, including PenCell Spreadsheet, Pocket Quicken, and several games. A pop-up on-screen keyboard lets you type quick memos and business letters—provided you have small fingers. If you don't, you can plug an optional external keyboard into the side of the unit.

—Jeff Bertolucci

ON-THE-ROAD E-MAIL: Sony's new 1.2-pound Magic Link device is a handy communications tool—but pricey at $995.

Magic Link PIC-1000

Handheld PC built for on-the-road communications.
Sony Electronics Inc.
800/556-2442
List price: $995
Reader service no. 853

Invasion of the 64-bit Graphics

- Fast 64-bit Acceleration
- Affordably Priced from $179**
- Instant Windows Mode Switching

The squadron of 64-bit graphics accelerators from ATI – the GRAPHICS PRO TURBO, WINTURBO and GRAPHICS XPRESSION – has landed. Affordably priced from only $179, they're attacking computers with rocket-like performance, laser sharp graphics and galactic true colors.

Hi-res, True Color Galaxies

Resistance is futile. High resolutions of up to 1280x1024 and 16.7 million true colors will overwhelm you. These advanced accelerators propel applications faster in true color than other cards using just 256 colors. And the superior performance, up to 42 million Winmarks*, will conquer even the most complex applications. Plus, the flicker-free display – at up to 100Hz – reduces eye-strain over prolonged periods of attack.

FlexDesk+
For enhanced operation and complete control of Windows options

Propelling Windows

Armed with an arsenal of utilities to enhance Windows, the *mach64* graphics accelerators breeze through Windows applications quickly and effortlessly. The unique WinSwitch feature allows color and resolution to be changed - *without restarting Windows.* A stellar range of software drivers enable popular operating systems to be explored – OS/2, UNIX, Windows NT, CAD, DOS and others.

WinSwitch
Change resolution and color without exiting Windows

Beam up an ATI 64-bit graphics accelerator today. There's one to meet every application, budget and bus type. They're light years ahead of other accelerators.

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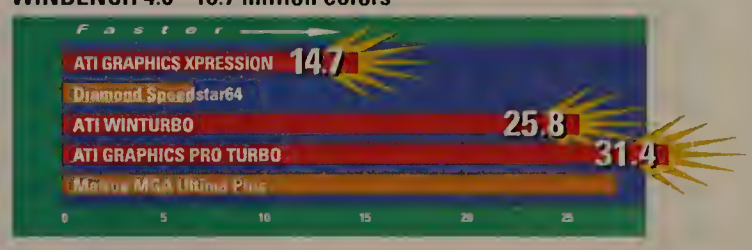
* WinBench 4.0 and PC Bench 8.0 performance tests done on a Pentium 90MHz, 16MB RAM, 256K cache, 420 MB HD, using 2MB and 4MB PCI graphics cards. WinBench 4.0 at 1024x768/256 colors (large fonts) and 800x600 in 16.7M colors (small fonts) at 70Hz refresh rate.
**Suggested US retail price, dealers may sell for less.

OTHER FEATURES

- Built-in motion video acceleration at no additional cost
- Fast DOS and VGA performance
- Supports OS/2, Windows, and Windows NT at any resolution, any color depth
- Up to 1280x1024 in 256 colors or 800x600 in 16.7 million colors with 2MB versions
- Easy installation and configuration
- Energy efficient Green PC support
- 5 year warranty
- ISA, PCI and VESA Local Bus versions

ISA Version Also Available

WINBENCH 4.0 - 16.7 million colors



WINBENCH 4.0 - 256 colors

Outperforms other accelerators in Windows.

GRAPHICS PRO TURBO

- For professional true color graphics
- 2MB (upgradeable) or 4MB VRAM memory
- Up to 1280x1024 resolution in 16.7 million colors
- Color calibration software
- Up to 100Hz refresh rate

$449-2MB $699-4MB**

WINTURBO

- Value priced VRAM accelerator (similar to GRAPHICS PRO TURBO)
- 2MB VRAM memory
- VRAM offers better performance at higher refresh and color depths

$369-2MB**

GRAPHICS XPRESSION

- Performance equal to VRAM accelerators at 256 colors
- 1MB (upgradeable) to 2MB DRAM memory
- Up to 75Hz flicker-free display

$179-1MB $249-2MB**

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'94 C GAAnalyst

PC WORLD BEST BUY

mach 64

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CompuServe: GO ATITECH

Circle 5 on reader service card

Persuasion 3.0 Finally Ready for Prime Time

There's no question that Persuasion was in dire need of an upgrade. Compared with recent releases of Software Publishing's Harvard Graphics and Microsoft's PowerPoint, Persuasion was rapidly becoming an ugly duckling. It lacked good color support and didn't use object linking and embedding during screen shows, which meant you couldn't use sound and animation clips in your electronic presentations. Version 3.0 rectifies these and other glaring faults, but the program could use more learning tools for beginners.

One of Persuasion's most attractive features is its PageMaker-like approach to laying out slides. The document window uses a pasteboard metaphor, so you build document pages and slides similar to the way you'd use a layout table. The previous version came complete with grid lines, T-square rulers, and a tabletop. Version 3.0 adds floating palettes of tools, lines, and colors that make it easier to customize your on-screen work area.

Persuasion 3.0 has a host of powerful features, including tools for gradient fills and Bézier curves. You can display a palette of OLE-compliant applications on your system and click an icon to embed a linked object. However, since Persuasion doesn't support OLE 2.0, you can't drag and drop objects between applications.

Persuasion 3.0 features an extensive online tutorial and thorough documentation. And since you can preview charts, clip art, and video and audio files, it's easy to pick the right components for your presentation.

If you're like most businesspeople, you seldom use presentation software. Maybe you create a presentation once a month—or even once a year. A good presentation package should help reorient you and get you going as quickly as possible. Other presentation packages beat Persuasion in this area. PowerPoint and Harvard Graphics provide on-screen cues, online references, design tips, context-sensitive tips, and loads of other features to help beginners and infrequent users. Persuasion lacks these important features, although its documentation and online tutorial do compensate somewhat.

Persuasion 3.0 is nevertheless a strong presentation program. It lets you create interactive presentations with hyperlinks that invoke multimedia events or launch other programs. While it's not as easy to learn and use as competing products, Persuasion provides all the tools you need to create great presentations. And since it's compatible with the Macintosh version, Windows users will have little trouble getting color slide and transparency output at Macintosh-oriented service bureaus.

Still, even though Persuasion 3.0 is much improved, the most recent releases of PowerPoint and Harvard Graphics are more advanced packages.

—William Harrel

PERSUASION 3.0's NEW FLOATING, CONTEXT-SENSITIVE PALETTES make it easier to create and edit your business presentations.

Persuasion 3.0

Vastly improved, but still daunting for beginners.
Adobe Systems
800/685-3617
List price: $495, upgrade $150
Reader service no. 613

Save Time on Expense Reports

Before you file an expense report, you have to sort through a trip's worth of receipts—unless you have Portable Software's QuickXpense for Windows. This new $99 expense manager lets you use your notebook to organize all those taxi and restaurant receipts filed *somewhere*.

You enter your purchases in QuickXpense's on-screen register, which resembles a checkbook register. The program sorts your expenses by date, category, project, client, and so on. QuickXpense then uses one of 15 user-selectable templates to fill in an expense report. Or you can have Portable Software create a custom template from your company's expense form. The custom template is free if you're in a Fortune 1000 company or if your company buys two or more copies of the program. Otherwise, it costs $49.

When the program finishes filling in the information, you can print or E-mail a copy of the completed expense report. QuickXpense works with any VIM or MAPI-compliant E-mail software.

At the department or companywide level, QuickXpense helps managers track and analyze group and individual expenses. You can break out expenses by region, job, personnel function, and so on.

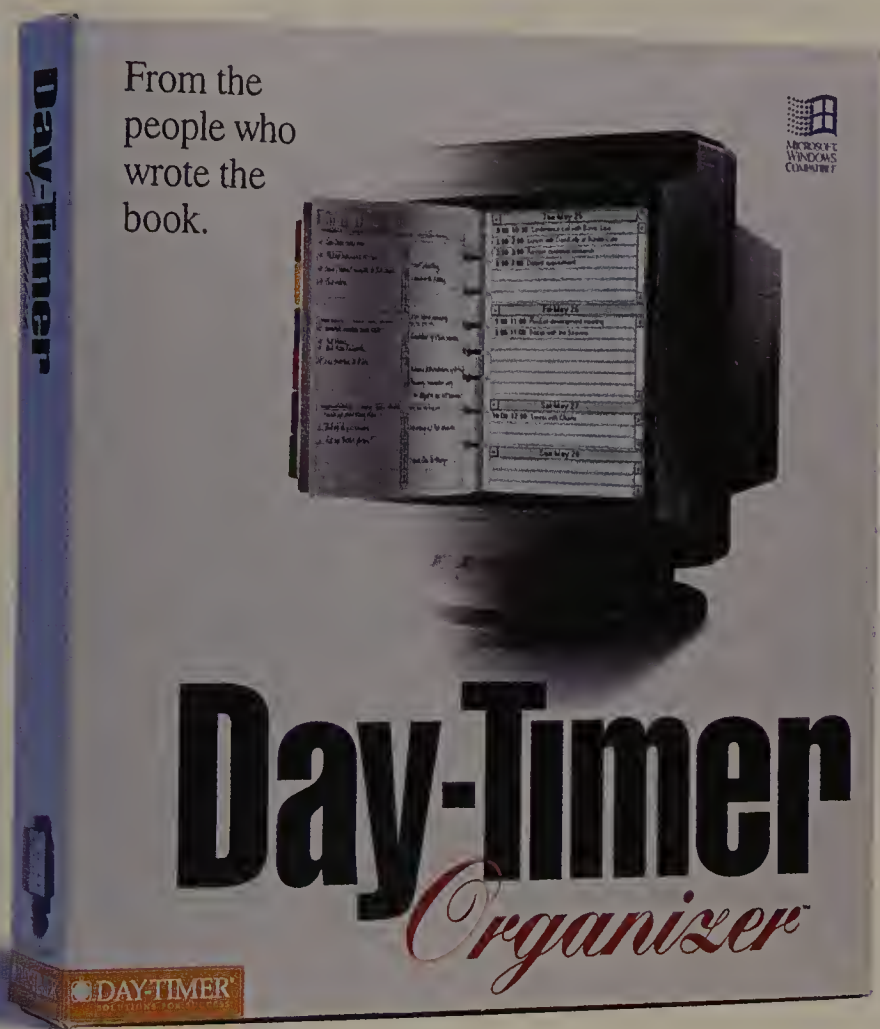
The software also does custom searches. For example, you could ask it to flag any dinners over $100. Learning QuickXpense should be a snap for anyone who's used a personal finance package.

—Laurianne McLaughlin

QuickXpense

Organizes expense receipts.
Portable Software Corp.
800/626-8620
List price: $99
Reader service no. 882

Only One Company Could Fit 47 Years Of Time Management Experience On A Disk.



The people who elevated time management to an art form, announce Day-Timer Organizer™— software that integrates a calendar, address book, to-do lists, notebook and expense tracker in one easily accessible place. Start it up and you'll immediately notice a striking resemblance to your daily planner, with its clear and familiar layout. Look a little closer and discover how the power of a computer lets you instantly retrieve and sort information. Of course, there are times when you're nowhere near your desktop but still need to keep information at hand. No problem. Day-Timer Organizer lets you print lists, schedules—anything you need— in formats that fit most planners. To learn more, see your favorite software retailer, or call 1-800-859-6955 and mention key #142791. Available in Windows, DOS or Network versions.

DAY-TIMER® TECHNOLOGIES

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Circle 17 on reader service card

CorelFlow and ABC SnapGraphics Go With the Flowchart

Ever tried to create a flowchart or diagram with a presentation or draw program? If so, you know that neither is up to the task. Creating charts, maps, and other types of diagrams in free-form draw software is, at best, a laborious task. And while some presentation packages do allow you to create organization charts, they're better suited to bulleted lists.

Corel's CorelFlow 2.0 and Micrografx's ABC SnapGraphics 2.0 can help.

The $99 CorelFlow was originally ADS Diagrammer, which Corel purchased from Atlantic Design Systems. Corel has done an impressive job of reworking the program's interface, whipping it into an adroit, intuitive diagramming package. The new toolbox and the interface in general now look remarkably like those in CorelDraw and Corel's other products—right down to the roll-up palettes, floating toolbox, and button bars. If you know how to use Corel applications, you're more than halfway to learning CorelFlow.

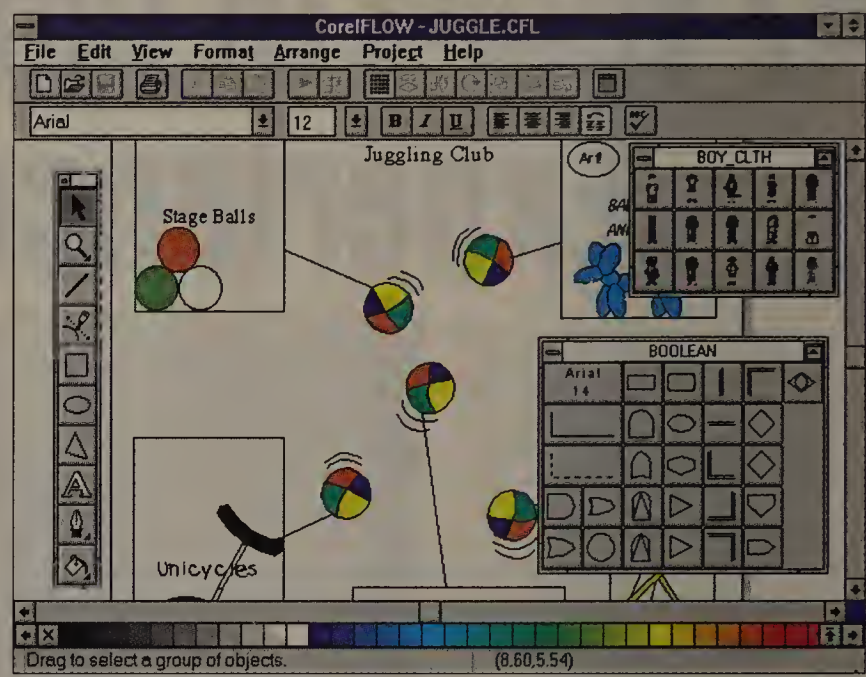
A primary difference, though, is the way CorelFlow uses templates. Instead of providing conventional templates, the program uses *workspaces* designed for specific types of diagrams. Let's say you want to design a floor plan. First, click the Floorplan diagram icon in the CorelFlow program group in Program Manager. The program loads with a palette of shapes (such as furniture pieces) and tools for creating your floor plan. A drawback to this approach: You must create your diagram from a blank page, which is difficult for beginners.

ABC SnapGraphics 2.0 includes a wealth of new features, including several designed to make the program easier for novices and infrequent users. Because most people don't use flowchart software daily or even weekly, features designed to make the program quicker to learn (and relearn) are great time-savers. ABC SnapGraphics 2.0 sports an improved online tutorial and a quick tour feature. A feature called SnapSteps, similar to CueCards in Microsoft PowerPoint, provides context-sensitive suggestions on diagram design.

Version 2.0 offers more shapes and a host of powerful new features. It can automatically number flowchart shapes—useful for referencing and organizing complex diagrams. You can now drag shapes from palettes and drop them in your diagram, and launch applications by double-clicking on shapes.

CorelFlow and ABC SnapGraphics perform the same tasks—but offer different advantages. CorelFlow's impressive font and clip art bundle makes it a great value, but ABC SnapGraphics' $49 introductory offer is also hard to resist.

—William Harrel



CORELFLOW 2.0 FEATURES A CORELDRAW-LIKE INTERFACE that provides a familiar, easy-to-use workspace for diagramming.

CorelFlow 2.0

Corel Corp.
800/772-6735
List price: $99
Reader service no. 615

ABC SnapGraphics 2.0

ABC SnapGraphics 2.0
Micrografx
800/676-3110
List price: $49 through March, then $99
Reader service no. 616

Corel Ventura 5 Is Worth the Wait

Corel Ventura 5 is arguably the best version yet of the former ruler of PC-based desktop publishing. While recent versions have paled in comparison with Aldus PageMaker and QuarkXPress, Ventura 5 is a born-again publishing tool: Its revamped interface sports plenty of well-designed CorelDraw-style features.

Changes to the interface include a new toolbox with multilayered menus that provide fast access to popular tools such as Zoom, Line, and Fill. And Ventura's new tabbed dialog boxes and enhanced ribbon bars make it easier to find essential functions such as page magnification.

Ventura's new Mosaic roll-up tool lets you easily drag and drop graphics onto a page from an image library. And the new Node Editing feature means you can finally create custom text wraps in any shape you want. Other notable improvements include a built-in text editor, enhanced import filters, and better font handling.

Other less visible enhancements to Ventura are equally important. The program is now part of the CorelDraw 5 application suite and shares printing, graphics, and color management engines with a number of other Corel products.

Although Ventura may still have a tough time gaining on the popular PageMaker and QuarkXPress, it's once again a serious competitor in the desktop publishing arena.

—Richard Jantz

Corel Ventura 5

Venerable desktop publisher makes a comeback.
Corel Corp.
800/772-6735
List price: $595, CD-ROM alone $495; upgrade $249
Reader service no. 617

NEW PRODUCTS CONTINUES ON PAGE 106.

LIKE IT OR NOT, A BUNCH OF TRASH HAS MOVED INTO YOUR COMPUTER.

It's shocking to look through your Windows™ and suddenly see that the electronic equivalents of the Clampetts have put down roots in your system. These are the homeless remnants of every program you ever thought you had replaced. UnInstaller chases out these useless, no-count data, restoring disk space and operating speed in seconds. For a suggested price of only $69.95, UnInstaller takes out the trash, leaving your Windows as valuable as the day you bought it. Only UnInstaller cleans Windows.

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UnInstaller is available at resellers everywhere.
Or call 800-922-3383 to order your copy today.

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Circle 161 on reader service card

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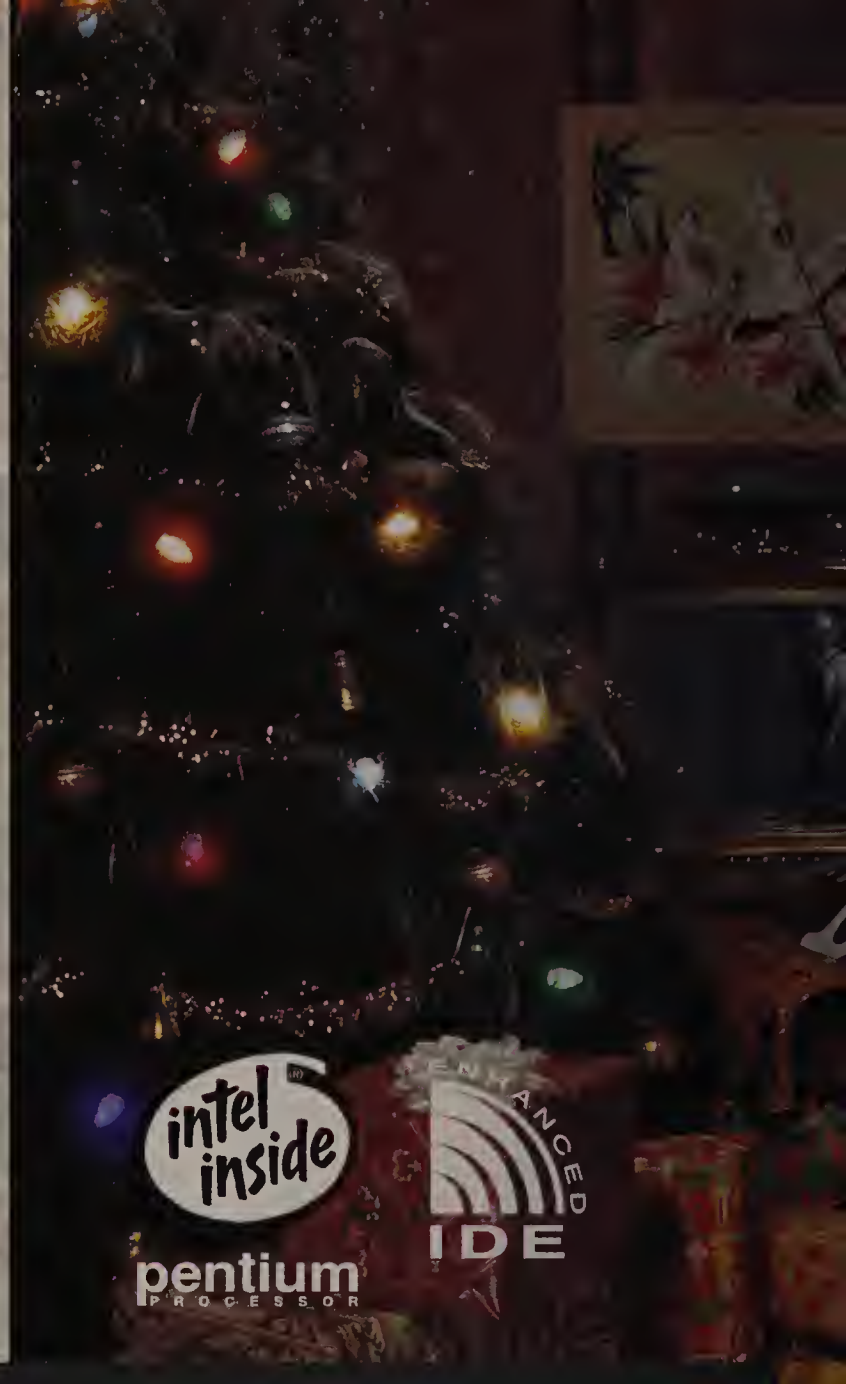
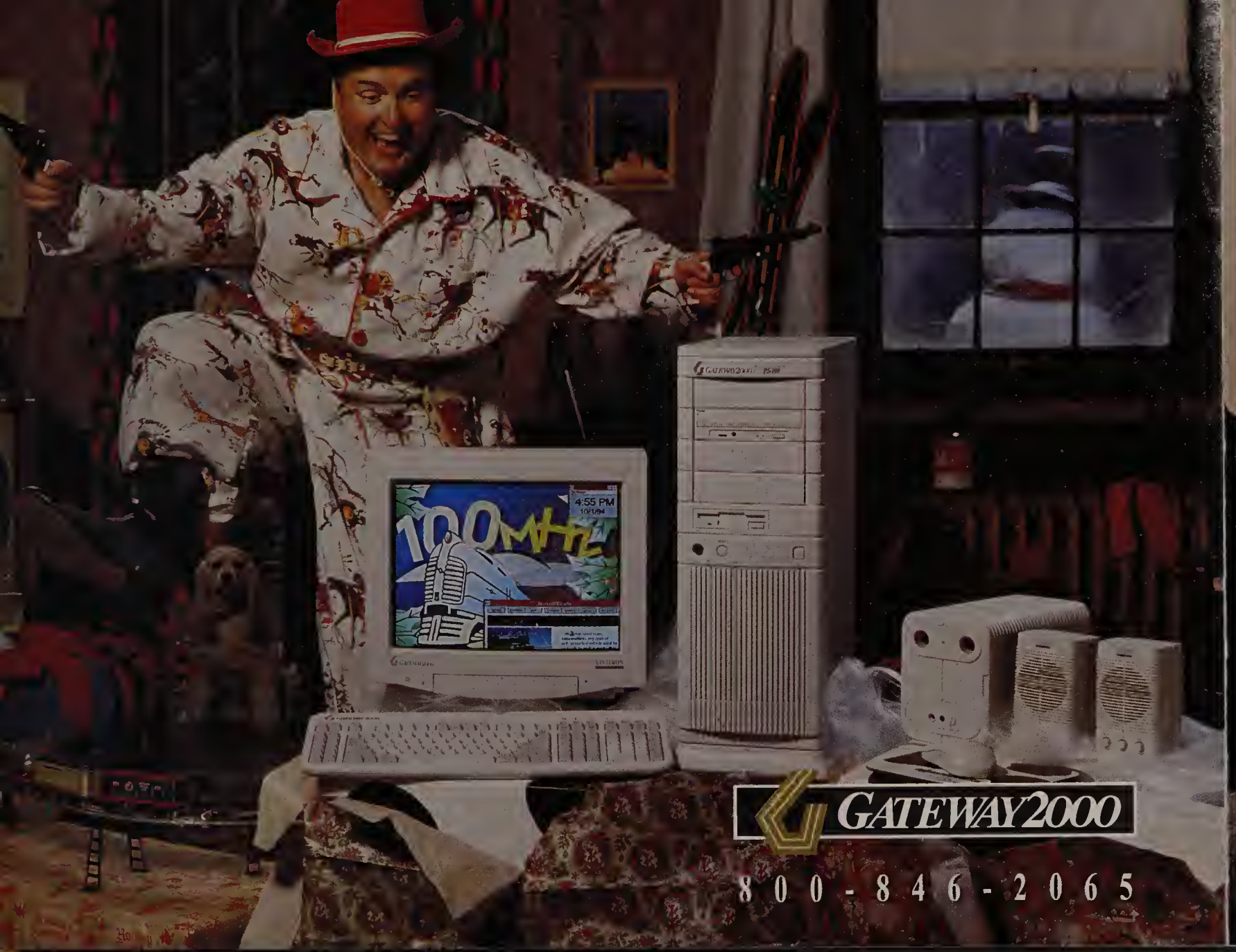
FLASH
Easy

Feel Like A Kid Again!
FLASH GORDON
wrist radio

"Oh boy, oh boy! I got it! I *got* it! HOT DOG! Wait till the gang sees this brand new shiny P5-100XL machine from Gateway 2000. Jumping gigabytes! I feel just like a kid again! I'm even more excited than when I got my Stream Line Electric train set back in 1958. I remember my brother Butch and I had a rootin' shootin' time making that train whiz around the track at lightening speeds. It was *the* most. But it can't compare to the powerhouse 100MHz Pentium processor-based system before me. It even has a quad-speed CD-ROM! I just wish Butch was here to see it. *(Hey Butch, na na na na na — I got the most awesome computer in the world this year! How's the box of orange wool socks from Aunt Doris?)* I think I'll invite Butch over to show off my new P5-100XL. We can watch full-motion video and hear stereo sound that rivals any home hi-fi with the ACS-31 speakers with subwoofer. I hear Gateway's multimedia features and software applications are more entertaining than watching Uncle Miltie. And I know if I ever have any questions about my new computer, the swell people at Gateway 2000 will always be there to help. Thanks Gateway, this has been the best holiday ever in the whole wide world!"

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GATEWAY2000
800-846-2065

Just in time for the holidays, Gateway 2000® introduces the power-hungry user's dream machine — the P5-100XL. Make the day merry with a 100MHz Pentium™ processor, 4X CD-ROM, and Gateway's new Vivitron™ color monitor using Sony® Trinitron® tube technology. We can't candy coat it...this is quite simply the best computer you can get today!

100MHz Power Train

How could it be faster? It can't! The new Intel® 100MHz Pentium processor in Gateway 2000's P5-100XL is the fastest processor available today that still lets you run all the most popular software applications. Imagine everything on your computer running at full throttle! Once only found in high-end file servers, now *you* can have the unsurpassed power and speed of a 100MHz Pentium processor right on your desk.

New 4X "Quad-Speed" CD-ROM Drive

Twice the speed of a double-speed CD-ROM! You'll be way ahead of the game with the fastest CD-ROM technology available today on your P5-100XL Pentium processor-based machine. Gateway's 4X "quad-speed" CD-ROM and 100MHz of computing power transform your system into a runaway power train. And with a throughput of 600KB per second, the quad-speed CD-ROM is the *only* way you can have true full-screen, full-motion video today. All today's and tomorrow's software applications fly, and video and animation are

smoother and cleaner. Gateway's quad-speed CD-ROM includes a motorized tray and is ATAPI compliant, something you'll need when Microsoft® Windows '95 comes along.

Gateway's New Vivitron Color Monitors!

For decades, Sony Trinitron technology has been the choice for millions who insist on only the *very* best. Now the best computer system in the world is paired with the best screen display in the world. Introducing Gateway 2000's new Vivitron color monitors. Using Sony Trinitron tube technology, these monitors give you the highest quality screen images available. Our 17-inch Vivitron monitor, standard with the P5-100XL, gives you brighter, richer, and crisper colors, a sharper focus and clearer image. With a .26 fine pitch, you'll also get an incredibly high screen definition. The new Vivitron monitor is standard on all Gateway systems that include a 15-inch or 17-inch monitor.

Microsoft Office Professional

This collection of Microsoft's most popular software applications is pre-installed on your Gateway P5-100XL. You get Microsoft Word, Excel, PowerPoint® presentation graphics program, Access® database, and Bookshelf.® Bookshelf includes seven best-selling reference books that include *The American Heritage Dictionary, The Concise Columbia Encyclopedia,* and *The World Alamanac and Book of Facts.*

Ida, age 7

"I can't stand secrets. My husband and kids always hide my presents because they know I'll try to sneak a peek if I can. This year was no exception. I waited until they were all asleep, then padded down the hallway, crept down the stairs, very quietly...*yikes*...remember the second step creaks! And...oh, wow, HOORAY! It's a Gateway 2000 P5-75 Family PC! I didn't care if the whole family heard me. Did I feel like a kid again? You bet! Suddenly I was back in circa 1965, when a tip-toe trip to the tree meant first having to free Fluffy's claws from the gold shag carpeting. Then while reaching for my Howdy Doody slippers, I was suddenly rendered blind by the glare of the silver tree, and I went crashing through the aluminum branches and piles of presents! I woke up the whole house that year. *This* year I soared through a billion applications in mere seconds with the 75MHz Pentium processor in that Gateway machine. I was sure the vivid colors of the new 15-inch Vivitron monitor were going to jump right out of the screen! My husband says the friendly salespeople at Gateway made sure we got the computer just right for us. The entire family can join in on my fun, because this powerful multimedia system has something for all of the 'kids' in this house!"

GATEWAY2000
800-846-2065

Your family's days and nights will be merry and bright with a P5-75 Family PC™ from Gateway 2000.®

Cruising at 75MHz

This full-featured multimedia Family PC is an investment in your family's future with a super-charged 75MHz Pentium™ processor, so all the included software applications in our Home Bundle run faster than ever!

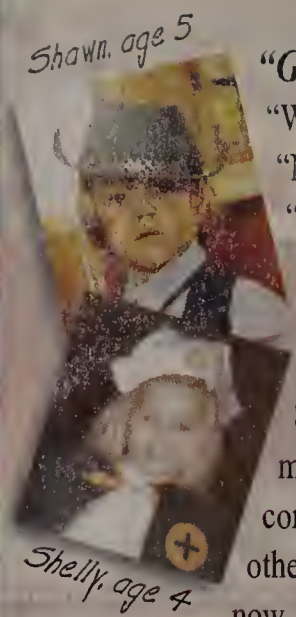
Family PC Power

As your family grows and changes, this Pentium processor-based Family PC will still be right in style. Power users are right at home with Intel®'s 75MHz Pentium processor and 730MB hard drive. For multimedia enthusiasts, a PCI local bus graphics card, double-speed CD-ROM, 16-bit sound card and Altec Lansing speakers are the coolest. And a TelePath™ fax/modem keeps everyone connected with the on-line universe. The Pentium processor lets you take full advantage of all these features and the many new generations of software applications. For tomorrow's multimedia superhighway, the P5-75 Family PC is your ticket to ride.

A Bright New Outlook!

Your P5-75 Family PC also includes Gateway 2000's new 15-inch Vivitron™ color monitor. All your colorful images will now be richer and brighter with Sony®'s Trinitron® tube technology built into these new monitors.

A Christmas Story
intel inside
pentium
PROCESSOR
ENHANCED
IDE



"Get outta my way!"

"Watch out Shelly, you doorknob! It's mine!"

"No, Shawn, it's mine!"

"Ah, it's just like being kids again, Shelly. Remember 1977? The presents, the fun, and Dad's dumb leisure suits? He'd always warn us, 'Kids watch out for that 8-track player, and don't touch your mother's shrine to Elvis!' We were *so* competitive, always fighting over each other's gifts. I'm glad we're all grown up now, and we get along so well, especially since you finally stopped being such a spoiled brat."

"Whatever, Shawn, I'm still Mom's favorite, you buttface."

"Well, I guess Gateway 2000's ColorBook and HandBook portable PCs have brought out the little hellions in us again. But we just can't help fighting over them!"

"Shawn's in awe of my HandBook's ultra-slim size, light weight and powerful 486 processor."

"And Shelly can hardly live with herself because she can't believe the full color capabilities of the ColorBook."

"Gosh Shawn, isn't it nice to have Gateway 2000 here to make us feel like kids again?"

"Yeah, it sure is. In fact, Mom thought now would be a good time to tell you that we really adopted you from Martians."

EASY-BAKE
GATEWAY2000
800-846-2065

HandBook® 486SX-33

Now you can have the revolutionary HandBook portable PC from Gateway 2000® for as low as $999! You're getting a real 486 PC that measures a mere 10 by 6 inches and weighs just under three pounds. This little stocking stuffer is the subnotebook to have by your side at all times. It's perfect alone or as a go-between when you're traveling from desktop to desktop.

HandBook 486SX-33

- 2.94 Lbs., 9.75" x 5.9" x 1.6"
- 4MB RAM
- 250MB Hard Drive
- Leather Carrying Case
- Microsoft® Works

$999

*ColorBook™ 486SX-33 QuickShip**

Quick! Make your (or someone else's) holidays brighter with Gateway's ColorBook portable PC. You can have the ColorBook 486SX-33 QuickShipped to your door within 48 hours* of ordering. And there's no reason to worry about that hard-to-buy-for person on your list. Everyone needs the colorful desktop performance of a Gateway 2000 ColorBook! Call today and ask about these and other great deals on Gateway portables.

ColorBook 486SX-33

- 5.7 Lbs., 11.7" x 8.5" x 1.77"
- 4MB RAM
- 250MB Hard Drive
- 9.4" Dual-Scan LCD
- 96/24 Fax/Modem
- Carrying Case
- Microsoft Works

$1999

*48-Hour QuickShip program applies only to the ColorBook 486SX-33 configuration. Your PC will be delivered within two business days from the time of order. No additions or deletions can be made to the configuration. Available for approved credit card orders only. Domestic U.S. orders only.

Rusty, Lily, Mary and John

"The warmth and fun of the holiday season is timeless. I guess with today's ultra-busy lifestyles, it's even more important to make memories and build traditions with family. Well, as long as you can stand sitting through the kids' 75 verses of 'Jingle Bells' and Uncle Ricky always stopping by to borrow the nutcracker. But years from now, my wife Lily and I will sit down to watch our holiday videos, and after we fast-foward past the cat eating tinsel off the tree, we'll remember how excited little John and Mary were to open that huge cow-spotted box from Gateway 2000. For just $1,899, Gateway gave us a full-featured multimedia system. And with all the great software titles pre-installed on our 4DX2-66 Family PC, Lily and I started feeling like kids too! Not enough to eat a whole tin of peanut brittle or anything, but we sure stayed up late that night exploring Microsoft Golf and Cinemania '95. Our Family PC has opened up whole new worlds for John and Mary, too. They've been entranced by MS Fine Artist, and Encarta multimedia encyclopedia. Lily and I are happy knowing that the fun and learning they experience with Gateway's 4DX2-66 Family PC will last them a lifetime."

MARY
DAD
MOM
JOHN
Artist
GATEWAY2000
800-846-2065

The Gateway 2000® 4DX2-66 Family PC™ brings all the rewards of a fully featured multimedia system into your home at a price that defines "family values." Our Family PCs start from $1,499 for the 4DX2-50 model and include a local bus graphics card, double-speed CD-ROM, 16-bit sound card and Altec Lansing speakers for a quality audio system. Listen to your music CDs, experience all the sights and sounds of the included multimedia software, and connect with people from all over the world through the standard fax/modem, including communications and on-line software.

A Cornucopia of Software!

An incomparable array of software is included with all Gateway 2000 systems — the most you'll get for your money...anywhere. All Gateway 486 and Pentium processor-based desktops are pre-installed with Microsoft® DOS® 6.22, Windows™ for Workgroups 3.11, and *now* Microsoft Money.

The Incomparable Home Bundle from Gateway

All Gateway Family PC configurations include our Home Bundle. This incredible collection of Microsoft software applications has literally everything your family needs to work, play and learn at home. You'll get MS Works, Encarta '95, Money, Cinemania '95, Golf and Fine Artist.

Microsoft Works 3.0 for Windows Multimedia Edition

You'll never need another software package for your home office. This program combines: a word processor, spreadsheet

with graphing, database, electronic communications, financial analysis, charting and illustration.

Microsoft Encarta '95 Multimedia Encyclopedia

Learning is an adventure with text, images, animations and sounds that work together to create a fascinating universe of knowledge. Over 25,000 articles, 17,000 multimedia elements and the complete text of Funk and Wagnall's New Encyclopedia are included.

Microsoft Money 3.0

Now every Gateway desktop system includes Microsoft Money, your personal financial wizard that'll help you take control of your finances and plan for the future.

Microsoft Cinemania® '95

Explore the magic behind the movies with hundreds of reviews, biographies, photos and sound clips.

Microsoft Multimedia Golf

Traverse the wonder of Torrey Pines, consult a golf pro, and play a game of golf any way you please. You'll experience real sounds of chirping birds, swinging clubs and gurlgling water.

Microsoft Fine Artist

Kids can create animated pictures and projects like posters and comic strips, and hear dozens of wacky sounds!

Gateway 2000® Family PCs™

4DX2-50 FAMILY PC

- Intel® 50MHz 486DX2 CPU*
- 4MB RAM
- 340MB 13ms IDE Hard Drive
- Local Bus Graphics with 1MB
- Double-Speed CD-ROM, 16-Bit Sound Card & Altec Speakers
- 2400/9600 Data/Fax Modem
- 3.5" Diskette Drive
- 14" Color SVGA Monitor
- Mini Desktop Case
- 101-Key Keyboard & Mouse
- MS-DOS® 6.22 & WFW 3.11
- MS Works,™ Encarta '95, Money,™ Cinemania '95, Golf & Fine Artist
- 3-Year Limited Parts Warranty

$1499

4DX2-66 FAMILY PC

- Intel 66MHz 486DX2 CPU*
- 8MB RAM
- 730MB 13ms IDE Hard Drive
- Local Bus Graphics with 1MB
- Double-Speed CD-ROM, 16-Bit Sound Card & Altec Speakers
- TelePath™ II 14.4K Fax/Modem
- 3.5" Diskette Drive
- 14" CrystalScan® Monitor
- Mini Desktop Case
- 101-Key Keyboard & Mouse
- MS-DOS 6.22 & WFW 3.11
- MS Works, Encarta '95, Money, Cinemania '95, Golf & Fine Artist
- 3-Year Limited Parts Warranty

$1899

P5-60 HOLIDAY SPECIAL

At press time, the Gateway 2000 elves were still busy finalizing this very special configuration to brighten your holidays. You'll get an unbelievable value on a 60MHz Pentium processor-based system so incredible that we needed more time to make it extra special!

Call today for all the details!

GATEWAY2000 FamilyPC

P5-75 FAMILY PC

- Intel 75MHz Pentium™ Processor*
- 8MB RAM, 256KB Cache
- 730MB 13ms IDE Hard Drive
- PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 1MB
- Double-Speed CD-ROM
- 16-Bit Sound Card & Altec Speakers
- TelePath II 14.4K Fax/Modem
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- 15" Vivitron™ Color Monitor
- Desktop Case
- AnyKey® Keyboard & Mouse MS-DOS 6.22 & WFW 3.11
- MS Works, Encarta '95, Money, Cinemania '95, Golf & Fine Artist
- 3-Year Limited Parts Warranty

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P5-90 FAMILY PC

- Intel 90MHz Pentium Processor*
- 8MB RAM, 256KB Cache
- 1GB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 2MB
- Double-Speed CD-ROM
- 16-Bit Sound Card & Altec Speakers
- TelePath II 14.4K Fax/Modem
- 3.5" Diskette Drive
- 15" Vivitron Color Monitor
- Desktop Case
- AnyKey Keyboard & Mouse
- MS-DOS 6.22 & WFW 3.11
- MS Works, Encarta '95, Money, Cinemania '95, Golf & Fine Artist
- 3-Year Limited Parts Warranty

$2899

The Special Treatment Only From Gateway 2000

Gateway's friendly employees are dedicated to providing our customers with only the best service and support. We'll custom configure any system to your specifications. You also get toll-free technical support for the life of your system and a 30-day money-back guarantee. All Gateway 2000 desktop PCs and monitors are backed by a three-year limited warrany on parts. Call or write us and we'll send you a free copy of our warranty.

Easy Payment Options

Gateway accepts most major credit cards and C.O.D. terms, with net 30-day terms and leasing options available to qualified commercial customers.

Gateway 2000 DuoLine™ MasterCard® card

You can apply for the Gateway 2000 DuoLine MasterCard card, issued by Dial National Bank, Des Moines, Iowa. Be sure to ask about our "90 Days No Payment" Program!

Professional Systems

4DX2-50

- Intel 50MHz 486DX2 CPU*
- 4MB RAM
- 340MB 13ms IDE Hard Drive
- Local Bus Graphics with 1MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 14" Color SVGA Monitor
- Mini Desktop Case
- 101-Key Keyboard & Mouse
- MS-DOS 6.22 & WFW 3.11
- MS Works & Money
- 3-Year Limited Parts Warranty

4DX2-50 $1299

4DX2-66 $1599

(w/ 540MB Hard Drive & 8MB RAM)

P4D-66

- Intel 66MHz 486DX2 CPU*
- 8MB RAM, 256KB Cache
- 730MB 13ms IDE Hard Drive
- PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 1MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Vivitron Color Monitor
- Desktop Case
- AnyKey Keyboard & Mouse
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional, Bookshelf & Money
- 3-Year Limited Parts Warranty

$1899

P5-75

- Intel 75MHz PentiumProcessor*
- 8MB RAM, 256KB Cache
- 730MB 13ms IDE Hard Drive
- PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 1MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Vivitron Color Monitor
- Desktop Case
- AnyKey Keyboard & Mouse
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional, Bookshelf, & Money
- 3-Year Limited Parts Warranty

$2299

P5-90 BEST BUY

- Intel 90MHz Pentium Processor*
- 8MB RAM, 256KB Cache
- 540MB 13ms IDE Hard Drive
- PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 2MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Vivitron Color Monitor
- Desktop Case
- AnyKey Keyboard & Mouse
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional, Bookshelf & Money
- 3-Year Limited Parts Warranty

$2499

P5-100XL

- Intel 100MHz Pentium Processor*
- 16MB RAM, 256KB Cache
- 1 GB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- ATI Mach 64 with 2MB VRAM
- Quad-Speed CD-ROM
- 16-Bit Wavetable Sound Card & Altec ACS-31 Speakers w/ Subwoofer
- 3.5" Diskette Drive
- 17" Vivitron Color Monitor
- Tower Case
- AnyKey Keyboard & Mouse
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional, Bookshelf & Money
- 3-Year Limited Parts Warranty

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Ask about our "90 Days No Payment" Program

90 DAYS NO PAYMENTS

*Intel Verified: Upgradable

intel inside

GATEWAY2000

"You've got a friend in the business."®

800-846-2065

Celebrate the season with festive extras from Gateway!

Gateway 2000 peripherals and software sold only with purchase of a system. Systems can be custom configured with the options listed below pre-installed.

Multimedia

Audio Starter Kit

Here's everything you need to add multimedia to a Gateway PC.

- Gateway 2000 16-bit CD-quality sound card, compatible with Sound Blaster™ cards, with MIDI/game port, mic in, stereo line in/out
- 2 Altec ACS-5 speakers
  $99 *(with system purchase)*

Wavetable Audio Multimedia Kit

Once you've heard wavetable audio, basic audio will never do!

- Ensoniq Soundscape 16-bit wavetable sound card, MT-32 and FM mode compatible. Supports most software for popular sound cards and standards including General MIDI, Sound Blaster, AdLib, Roland MPU 401, MS Windows Sound Sytem and MT 32
- New Altec Lansing ACS-31 three-piece speaker system
  $249 *(with system purchase)*
  $119 *(to upgrade from systems that include the Gateway 16-bit sound card and Altec speakers)*

Altec Lansing ACS-31 Speakers

A Gateway exclusive from Altec Lansing: a three-piece speaker set at a two-piece price. Two 3-inch free-standing speakers crank out up to five watts per channel while the subwoofer can deliver 15 watts of heart-pounding bass.
$99 *(with system purchase)*
$60 *(to upgrade from systems that include Altec speakers)*

Multimedia Software Starter Pack

You get nearly $700 worth of software for less than $100! Package includes Mad Dog McCree, Tuneland, Mayo Clinic Family Health Book, Better Homes and Gardens Cookbook, The Lawnmower Man, Sitting on the Farm, Mavis Beacon Teaches Typing, Chess Master 3000, U.S. Atlas and World Atlas. You also get a compact disc cleaner and 20-disk storage rack. **$75**

Call and ask about flight pack software including some of the latest flight titles from Gateway.

Monitor

New Gateway 17-Inch Vivitron™ Color Monitor

Non-interlaced color monitor using Sony® Trinitron® tube technology, capable of 1280 x 1024 resolution in non-interlaced mode, .26 fine pitch.
Upgrade from a 14-inch CrystalScan® 1024NI monitor **$360**
Upgrade from a 15-inch Vivitron 1572 monitor **$260**

Communications & Storage

TelePath™ II Fax/Modem

Internal fax/modem, 14,400bps modem, V.32bis, with 14,400bps fax capability. Includes data and fax communication software, CoSession™ Host remote diagnostics, plus a CompuServe® trial membership. **$99**

Colorado Memory Systems® TBU

250MB internal tape backup unit copies up to 9.5MB per minute. Comes with Microsoft® Windows™ and DOS® software, one tape and cable. **$149**

Printers

Epson® Stylus™ 800+ Ink Jet Printer

Get the look of a laser at a dot matrix price with the Stylus 800+. Prints 165 characters per second at 360dpi — fast and quiet!
Includes parallel cable. **$219**

Epson ActionLaser 1100 Laser Printer

Get advanced laser printing at a personal laser price. Features include edge-smoothing technology for incredible sharp printing of text and graphics, 22 fonts and 1MB memory.
Includes parallel cable. **$499**

Epson Stylus Color Ink Jet Printer

A high-quality color printer at an affordable price! Features 360dpi or up to 720dpi using specially coated paper. Exclusive technology eliminates "feathering."
Includes parallel cable. **$579**

Hewlett®-Packard 4L LaserJet Printer

A full-featured 300dpi printer loaded with enhanced PCL 5 and 26 scaleable typefaces with 1MB standard HP Memory Enhancement Technology.
Includes parallel cable. **$699**

Hewlett-Packard 4P LaserJet Printer

A 600dpi printer for four times the dots of 300dpi laser printing with enhanced PCL 5 and 45 scalable typefaces. 2MB standard memory and 3 universal SIMM slots available for additional memory or PostScript fonts.
Includes parallel cable. **$999**

Call for other printer options, including more ***Hewlett-Packard*** *printers.*

Call the Gateway 2000 special component add-ons division at 800-846-2080 for our complete line of extras for Gateway customers.
Sales hours: 7am-9pm Weekdays.

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GATEWAY2000
"You've got a friend in the business."®

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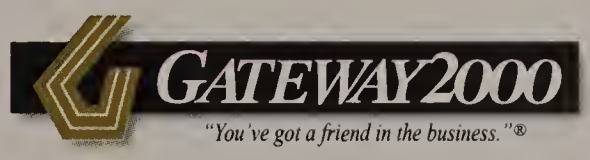

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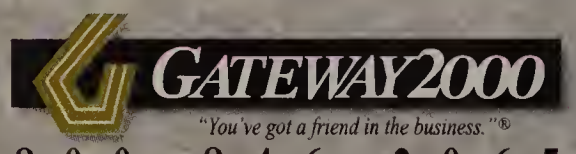

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XTree Gold 4.0: Something Old, Something New

Devotees of XTree, the venerable DOS-based file management utility, are a loyal bunch—so much so that many have stuck with the program even after adopting other Windows applications. With XTree Gold 4.0 for Windows, Central Point Software intends to nudge such followers into Windows on a full-time basis.

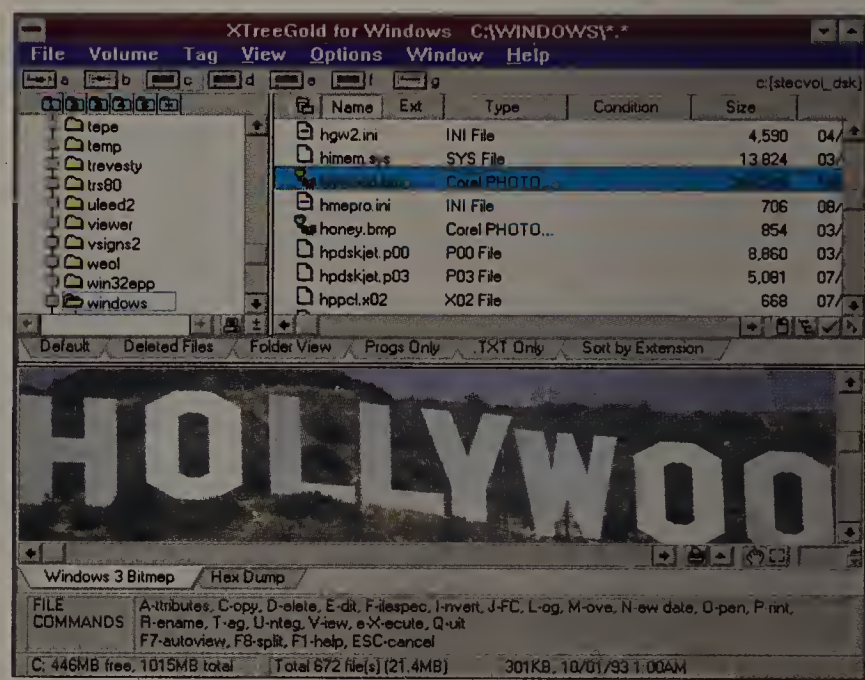
This isn't the first Windows version of XTree, but earlier releases strayed from the DOS program's approach to keyboard commands and interface design. XTree 4.0, however, lets you use the DOS XTree keystrokes to rapidly move around directories, copy and move files, and perform other disk management tasks.

Apart from being compatible with its DOS predecessor, XTree 4.0 is the very model of a Windows File Manager substitute. There's a mouse equivalent for every keyboard command, and you can view and print text and graphics files in an impressive range of formats.

Few utilities offer as many options for sorting directories, and you can save and recall various directory views by clicking folder-like tabs. Users of PC Tools for Windows will find a number of the features familiar, including File Companions, which provide basic file maintenance from within any program. And if you're not a true fan of XTree for DOS, you can switch to a mode that removes all traces of the traditional XTree interface.

XTree 4.0 will support the long file names and other new features of Windows 95. While that OS's Explorer promises to be an improvement over the much-maligned Windows 3.1 File Manager, XTree's suite of tools should continue to appeal to the program's loyal followers and power users.

—Harry McCracken



XTREE GOLD 4.0 FOR WINDOWS combines classic XTree features with a tabbed interface, file viewer, and other up-to-date tools.

XTree Gold 4.0 for Windows

The classic utility prepares for Windows 95.
Central Point Software
800/964-6896
List price: $99.95; $25 rebate for XTree users.
Reader service no. 702

AnyView Pro Changes Resolutions and Color in a Snap

I like to run Windows in 256 colors. But some multimedia programs look awful in that mode, and I know at least one game that crashes Windows if given more than 16 colors to consider.

The solution to this and other graphics-related problems may be Binar Graphics' AnyView Professional, a utility that strengthens some of Windows' fundamental weaknesses. I looked at a prerelease copy; the final version should be out by the time you read this.

The original version of AnyView switched Windows resolution on the fly, letting you move from 640-by-480 to 800-by-600 to 1024-by-768 and beyond—all with a mouse click and without leaving Windows. The new AnyView Professional adds color depth control. If 256 colors aren't enough for you, just click an icon and you've got 16.8 million. If all those colors slow your spreadsheet to a crawl, click again to return to 256 or 16. You can change color depth and resolution via AnyView's toolbar and Program Manager icons, and best of all, you can assign color depth and resolution to individual programs. For instance, AnyView Pro can change Windows to 1024-by-768 whenever you launch Excel or 1-2-3.

AnyView Pro has other tricks to make Windows more resourceful. Windows keeps its system resources—data storage areas for managing windows and applications—in several 64K chunks. When one of those chunks gets too full, things start to go wrong—including 'insufficient memory' error messages. AnyView Professional helps Windows manage its resources more efficiently and cleans up after errant programs.

Other new goodies include the capability to calibrate and fine-tune screen colors, adjusting the RGB and contrast settings in minute detail. If you have an Energy Star–compliant monitor, AnyView will shut it down after a specified period of inactivity. There's also a graphics accelerator that, according to Binar, speeds up Windows screen redraws by 10 to 25 percent. And AnyView's user interface has been improved, with stylish tabbed pages to help you select options.

Although Windows 95 will supposedly let you change color depth and resolution on the fly, its arrival is still months away. AnyView Professional could make the wait a lot easier.

—Lincoln Spector

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DOS Is Dead? Not in Accounting Software

If you're a small-business owner who hasn't made the move to Windows, you'll be happy to know there's still a good selection of inexpensive yet capable DOS accounting packages to help you balance the books. Among the DOS holdovers are upgrades of three popular accounting programs: BusinessWorks 9.0, DacEasy Five, and Peachtree 8.0.

Georgia Peach

Peachtree Software's Peachtree Complete Accounting 8.0 for DOS has almost 100 enhancements, although most are relatively minor. The accounts receivable and accounts payable functions bring the most welcome changes. Now you can open more than one fiscal period (or file), enabling you to begin entering transactions for a new month before closing the previous one.

Another enhancement lets you change transactions without the need for an adjusting entry. For instance, you now can change a transaction amount without leaving any audit trail in Peachtree's database. Most users will welcome this change, but some auditors will deplore the lack of an audit trail.

Unfortunately, Peachtree's geriatric user interface hasn't changed much since the late 1980s and could use a major overhaul. And the program is too slow, with distinct pauses between program actions.

Easy as Dac

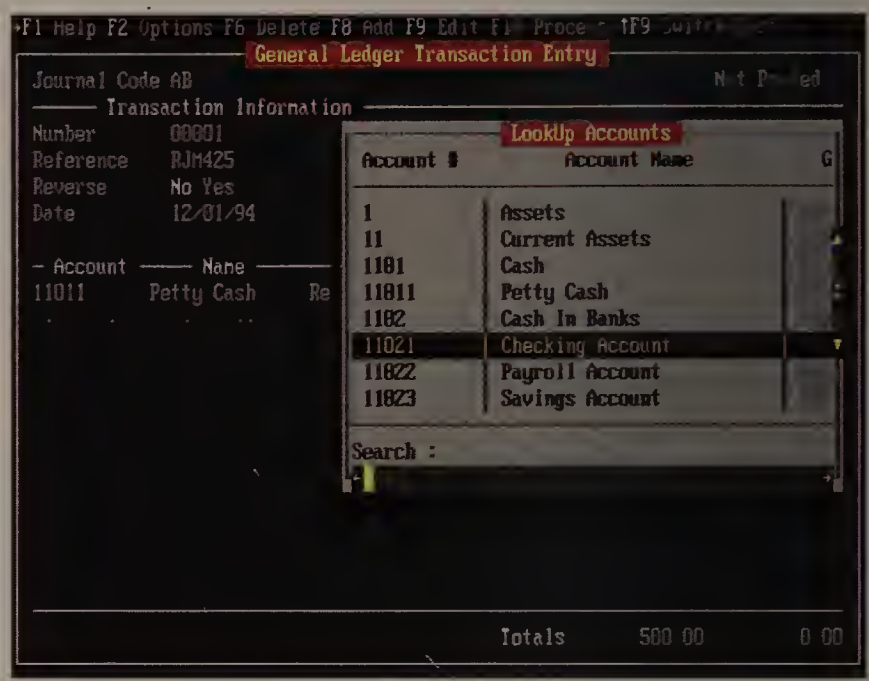
DacEasy's DacEasy Accounting Five is Peachtree's closest competitor in the low-priced DOS accounting market, and it offers more than 70 improvements.

I like Dac's new and easier company setup feature. A question-and-answer format speeds the creation of a company's chart of accounts, the backbone of any accounting system.

Enhanced reporting features let you extract data from multiple files and create more sophisticated reports. Another smart new feature, a phone dialer, makes it easier to keep in touch with your customers.

Dac's drop-down menu interface is more sophisticated than Peachtree's. For instance, Dac's menus are organized around tasks, such as posting and reporting, rather than by accounting function, the more conventional approach.

Dac sells its software a little differently: You get the accounting basics for $149.95 and can add the payroll module for another $149.95. Or you can save $50 by buying both in a BonusPack. Other add-on modules include the $299.95 DacEasy Executive Information System, which runs under Windows.



DACEASY ACCOUNTING FIVE makes it easy to look up account information when entering a transaction.

It Works for Business

If you'd like a program with a little more financial punch, consider Manzanita Software's BusinessWorks Accounting 9.0. This upgrade adds more than 100 features and is available in DOS and Windows versions. Unlike Peachtree and DacEasy, BusinessWorks is sold only as modules. You start with the program's System Manager, then select from modules such as general ledger and accounts payable to add the accounting functions you need.

BusinessWorks' nifty new Notepad lets you attach comments to a specific customer's or supplier's record. For example, you could keep detailed notes of collection calls made to a deadbeat customer.

The program's financial and sales reporting features have been improved. Date-sensitive income statements let you track financial performance over a period of time. To track a sales promotion, for instance, you can retrieve income statements for a specified period, say, from June 3 to June 17. Previously you could only get such statements for the entire month.

Which program is best? BusinessWorks can be much more expensive than Peachtree and DacEasy, depending upon the modules you require. However, it offers more options and is useful for businesses with annual revenues ranging from $1 million to $10 million.

Peachtree delivers a broad range of bookkeeping functions for a penny-pinching price. However, the package offers the least depth, so companies with annual revenues of more than $3 million or so could find themselves limited.

With its add-on modules, DacEasy delivers capabilities that span the widest range of business needs. Smaller companies should be pleased with the basic package, while bigger companies will like the ability to add modules to accomplish specific accounting tasks.

—Richard Morochove

BusinessWorks Accounting 9.0

Manzanita Software
800/447-5700
List price: $395 per module, System Manager $95
Reader service no. 897

DacEasy Accounting Five

DacEasy, Inc.
800/322-3279
List price: $149.95 (separate modules are extra)
Reader service no. 898

Peachtree Complete Accounting for DOS 8.0

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Entrepreneur Alert: Tips for Starting Your Own Business

The advantages of owning your own business are seductive: You're the boss, you set your hours, and people report to you. But it's easy to forget what it takes to get there—money, time, and patience. Zelos's How to Really Start Your Own Business advises you on patience, but it won't tell you how to find other necessary ingredients.

This CD-ROM is based on the best-selling book and video of the same name from *Inc.* magazine. Right away I thought I was going to find valuable information. The first "chapter" is titled "Reality Therapy." Here, nine entrepreneurs tell you to be patient and create a business concept—but little else.

The program's Info Map lists a plethora of business concepts, including sections on research, business analysis, plans, and finance. However, the text doesn't tell you where to research, how to analyze a specific marketplace or create a business plan, or even where to find the best financial resources.

A resource guide is included, but it's a bit sparse. It lists where to look for more information on financing, sales, and marketing topics, but it doesn't provide any more details than a business resource book. And while the program offers workbook exercises to help you structure your business plan, you can't print any of the information. For $49.95, this CD-ROM should provide more useful business advice. As it is, I'd rather just subscribe to *Inc.* and buy a resource book.

—Arden M. Hoffman

How to Really Start Your Own Business

MULTIMEDIA **Tips for the ambitious entrepreneur.**
Zelos/Inc. Magazine
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Street price: $49.95
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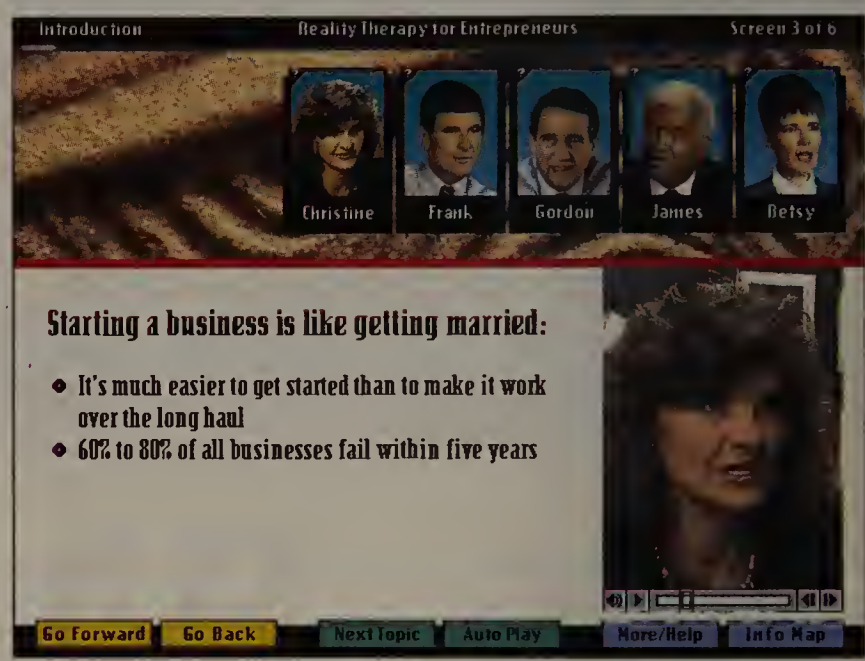


ZELOS'S HOW TO REALLY START YOUR OWN BUSINESS offers tips from successful entrepreneurs, but much of the advice is repetitive.

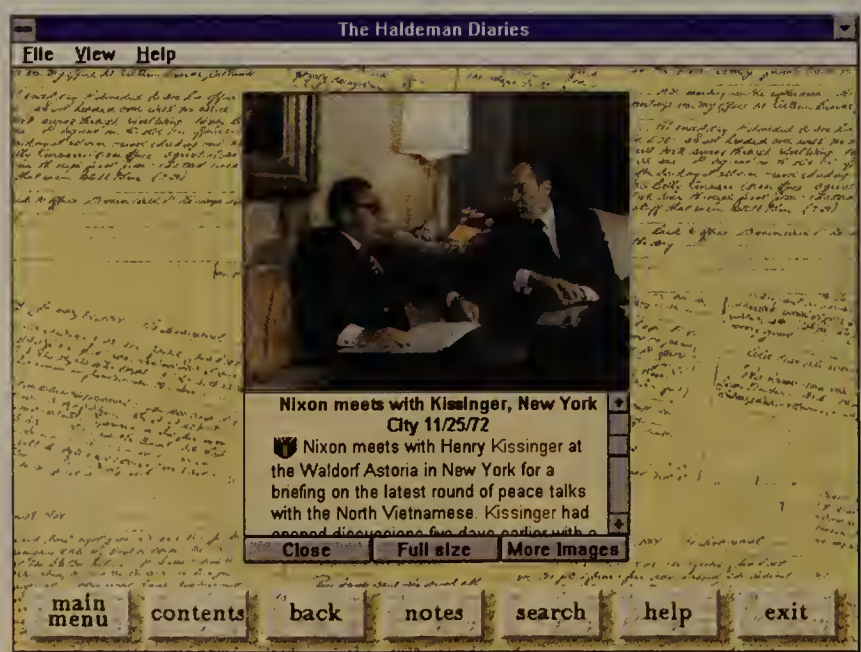
An Insider's View of the Nixon Presidency

What did Richard M. Nixon *really* think about Woodward and Bernstein? the bombing of Cambodia? cottage cheese? Here are the complete diaries (well, almost complete—a few passages have been censored) of H. R. Haldeman, chief of staff for President Nixon from January 1969 to May 1973. And here, too, is one of the best examples of the power of CD-ROM.

There's also a book out on the Haldeman diaries, but it contains only a fraction of what you'll find on this CD-ROM. And the book is nowhere near as easy to search. Want to find out about Kissinger and China? Do a quick search and you'll find 82 matches in 55 entries. The View menu provides easy access to the disk's contents. You also get photos, biographies, and clips from Haldeman's home movies—in case you really want to see Richard Nixon greeting General Franco.

Don't expect a detailed account of the Watergate saga. When Haldeman resigned, the scandal was still in its early days, and his boss would still be employed for another 15 months. The user interface could be a bit smoother, and the program doesn't allow you to copy text to the Clipboard. But The Haldeman Diaries is still a fascinating, detailed, and easy-to-search account of one of the most turbulent times in recent American history.

—Lincoln Spector



QUICK REFERENCE TO THE NIXON YEARS: In The Haldeman Diaries, you can look up subjects from H. R. Haldeman's daily journal.

The Haldeman Diaries

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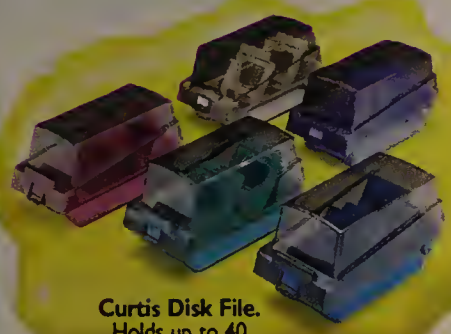

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Circle 52 on reader service card

ShareVision PC3000 Makes You a Desktop Video Star

If you think that two-way video conferencing on desktop PCs is strictly a gimmick, think again. After using ShareVision PC3000, I'm a true believer. Besides offering two-way color video conferencing, the product has application sharing, data transfer, and an interactive whiteboard for group collaboration. And ShareVision is an easy-to-install package that works surprisingly well over POTS (the Plain Old Telephone System)—no high-speed ISDN lines needed.

Opening the ShareVision box is daunting. It's chock-full of parts and pieces: Two ISA add-in boards, a cigarette pack–size color video camera, an external 28.8-kbps fax-modem, a Plantronics headset, a bevy of cables, two AC adapters, and four disks. To make matters worse, the prerelease version I tested had minimal documentation. Such is the stuff of potential installation nightmares. But ShareVision turned out to be one of the easiest installations I've ever done. In about 45 minutes, it was up and running with nary a hitch, even in a test system loaded with other peripherals and cards.

Though its two add-in boards have dedicated processors, ShareVision puts your system's CPU to the test. Creative's Video Blaster RT300 video capture/compression board tackles many video chores, while a communications card does the audio and data processing. Since your PC's processor must handle the video decompression, you'll need at least a 33-MHz 386 PC to run ShareVision. Creative Labs recommends a 66-MHz 486 (and that's what I used for my test).

Connecting with another ShareVision user is as simple as making a phone call. The two modems negotiate a maximum speed, then up pops a video screen showing the person you've called. While the image isn't full-motion, 30-frame-per-second (fps) quality, it's not difficult to get used to. ShareVision cleverly and continuously varies the frame rate between about 5 and 15 fps, depending on what other tasks you're doing. For example, sharing an application takes a lot of processing power, and the video motion virtually stops for a while. But that's not a problem, because your attention is on the application rather than on the video image.

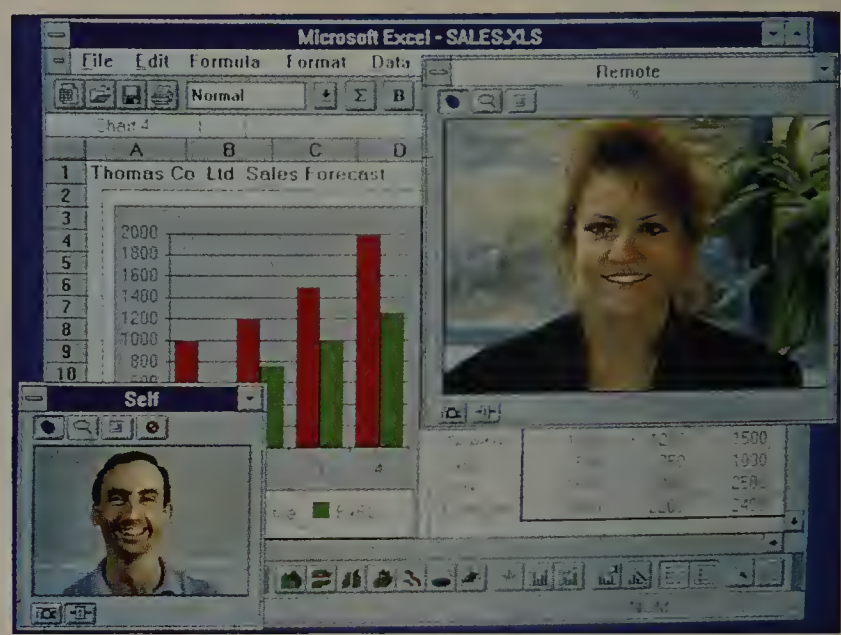
With a list price of $1599, ShareVision PC3000 is obviously for serious users. (A version without video is available for $749.) While the price is steep, you can also use the fax-modem and video capture card with other applications.

It's amazing how much it adds to be able to see the person you're working with. There is, however, one disadvantage for those of us who work by ourselves: I had to remember to comb my hair and think about what I was wearing before going "on the air."

—Stan Miastkowski

ShareVision PC3000

Video, application sharing, and more over standard phone lines.
Creative Labs
800/998-1000
List price: $1599, model with no live video $749
Reader service no. 728



APPEARANCES COUNT: Creative Labs' ShareVision PC3000 provides video conferencing, application sharing, and more.

Eudora Puts E-Mail in Its Place

Gone are the days when the morning E-mail brought 1, 6, or even a dozen messages. With the thousands of mailing lists now distributed over the Internet, it's not uncommon to get more than 100 E-mail messages a day. You need a sophisticated mail tool to handle this growing flood, and Eudora 2.02 fits the bill better than most.

The most compelling reason to make the switch to Eudora is its ability to automatically route messages into the appropriate mail folders. Just select an identifying string of text, such as a return address or a mailing list name, and Eudora will direct messages accordingly into a folder of your choosing. You can subscribe to as many Internet mailing lists as you can count, and the mail they generate won't interfere with the core mail that's important to you.

Eudora was conceived as freeware on the Internet, and several months ago it made the transition to a commercial product. As a child of the Internet, Eudora is designed to operate over TCP/IP (Transmission Control Protocol/Internet Protocol) networks. While TCP/IP is the glue that holds the Net together, it's also popular in corporate networks. This means that Eudora is equally useful for Internet traffic and on corporate LANs running Internet communications protocols.

Cleanly implemented and simple to use, Eudora has become one of my favorite tools for cruising the net. At $65 (for a single user; group rates are available), it's also a bargain.

—Joe Abernathy

Eudora 2.02 for Windows

Handles Internet and TCP/IP-based E-mail.
Qualcomm Inc.
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Circle 35 on reader service card

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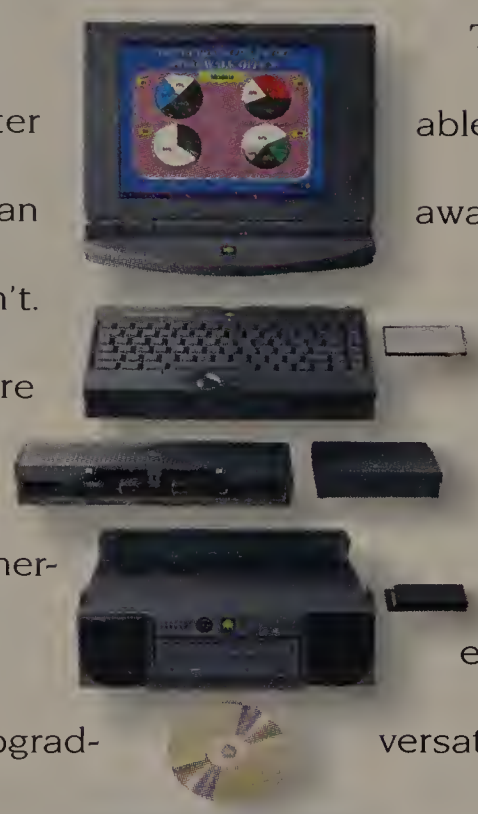

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Circle 192 on reader service card

NetWare Connect Improves Your Remote Possibilities

If your business is ready to make the leap into telecommuting, Novell's NetWare Connect 1.0 can turn a NetWare-equipped PC into a modem-sharing communications server.

NetWare Connect distinguishes itself from other modem-sharing products in two ways. First, it's a software-only product, meaning that a LAN administrator can build a communications server by adding off-the-shelf modems and serial ports to a dedicated PC or a NetWare server. Second, NetWare Connect is one of the few products in this category that can truly cover all the bases of a company's communications: Modems connected to a NetWare Connect server can be used by in-house staff to dial out, and by remote users to dial into the office LAN.

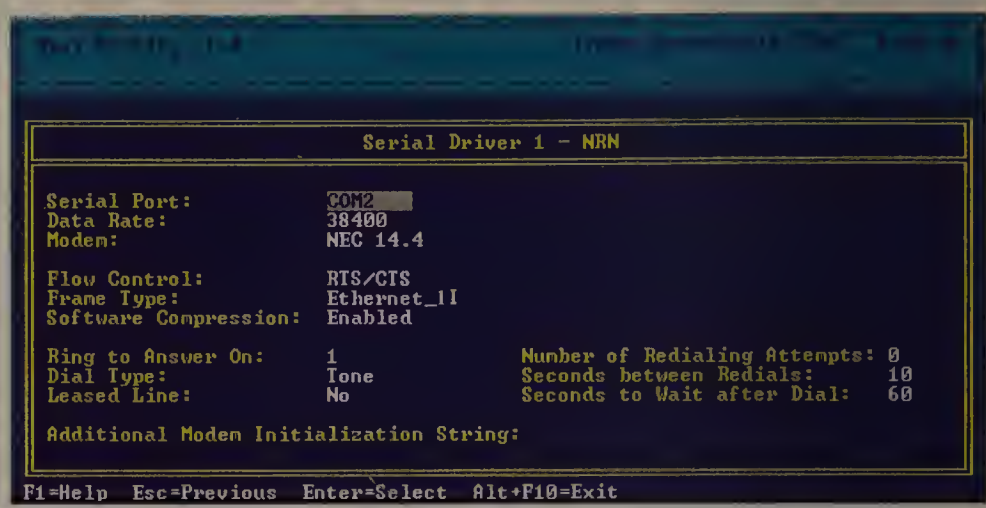
With the right mix of NetWare Connect's utilities, third-party software, and a talented LAN administrator, a communications server can make you forget about your personal modem. You can dial into your network as a remote node, or use the remote-control feature to take control of a PC on the LAN. You can also use a NetWare Connect modem to make outbound calls, provided that your PC's communications software is configured to work with the NetWare Connect server.

But while NetWare Connect is a jack of many communications trades, it's not the master of all of them. Although the server component is a powerful and flexible communications back end, the end-user software leaves much to be desired. For example, to dial in as a remote node, you must use a complex configuration procedure and a plain-vanilla DOS interface that lacks a facility for storing phone numbers. Making an outbound call via NetWare Connect is similarly inelegant. For instance, before starting Windows you must first load a large and cumbersome DOS driver.

Ironically, NetWare Connect's feeble front end is matched with one of the best communications back ends in the business. NetWare Connect will run on any existing NetWare server or on a dedicated PC using a run-time version of NetWare that ships with NetWare Connect. Depending on the license count that you purchase, you can connect from 2 to 32 modems to a single server. And in addition to standard dial-up telephone lines, NetWare Connect supports ISDN lines and X.25 data networks. It also allows LAN administrators to set a maximum connect time for each user.

There's a lot to like about NetWare Connect, but there's also some unfinished business. The current DOS client software needs a face-lift, and the product needs a Windows client and virtual drivers to supplement the memory-resident DOS drivers. Until these improvements occur, the program's not ready for prime time.

—Bill Lawrence



NETWARE CONNECT'S CLIENT SOFTWARE includes a plain-vanilla DOS interface and a complex setup procedure for end users.

NetWare Connect 1.0

NetWare-based software for dial-in, dial-out communications needs more work.
Novell, Inc.
800/638-9273, 801/429-7000
List price: 2-port license $595, 8-port license $2195, 32-port license $5995
Reader service no. 730

Revolutionary Hybrid Modems

For many PC users, ISDN has become more than just another arcane acronym. This high-speed digital phone technology allows everything from decent motion video to lightning-fast file transfer and is rapidly becoming affordable. The catch is, conventional modems won't work with it.

Or they didn't until now. Motorola's HMTA 200 is an external communications device that handles both high-speed digital and traditional data and fax calls on a single ISDN line. To make a data call, you just tell the HMTA 200 whether you're calling through the ISDN terminal adapter or the modem. Receiving is even easier—the HMTA 200 automatically detects whether an incoming call is ISDN, conventional data, or fax. And people who use Switched 56 digital lines need not feel left out—Motorola's DM 170 offers the same features for customers of this high-speed digital communications service.

Both the HMTA 200 and the DM 170 transmit faxes and data at speeds of up to 14.4-kbps using the V.32bis and V.17 standards. In 1995 Motorola will offer a user-installable upgrade card to bump up data speeds to 28.8 kbps using the V.34 standard. One caveat: Many PCs have outdated serial ports that can't handle the high-speed performance of these products.

—Bryan Hastings

HMTA 200, DM 170

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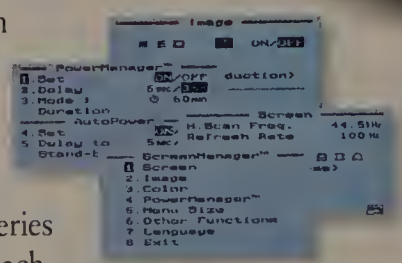

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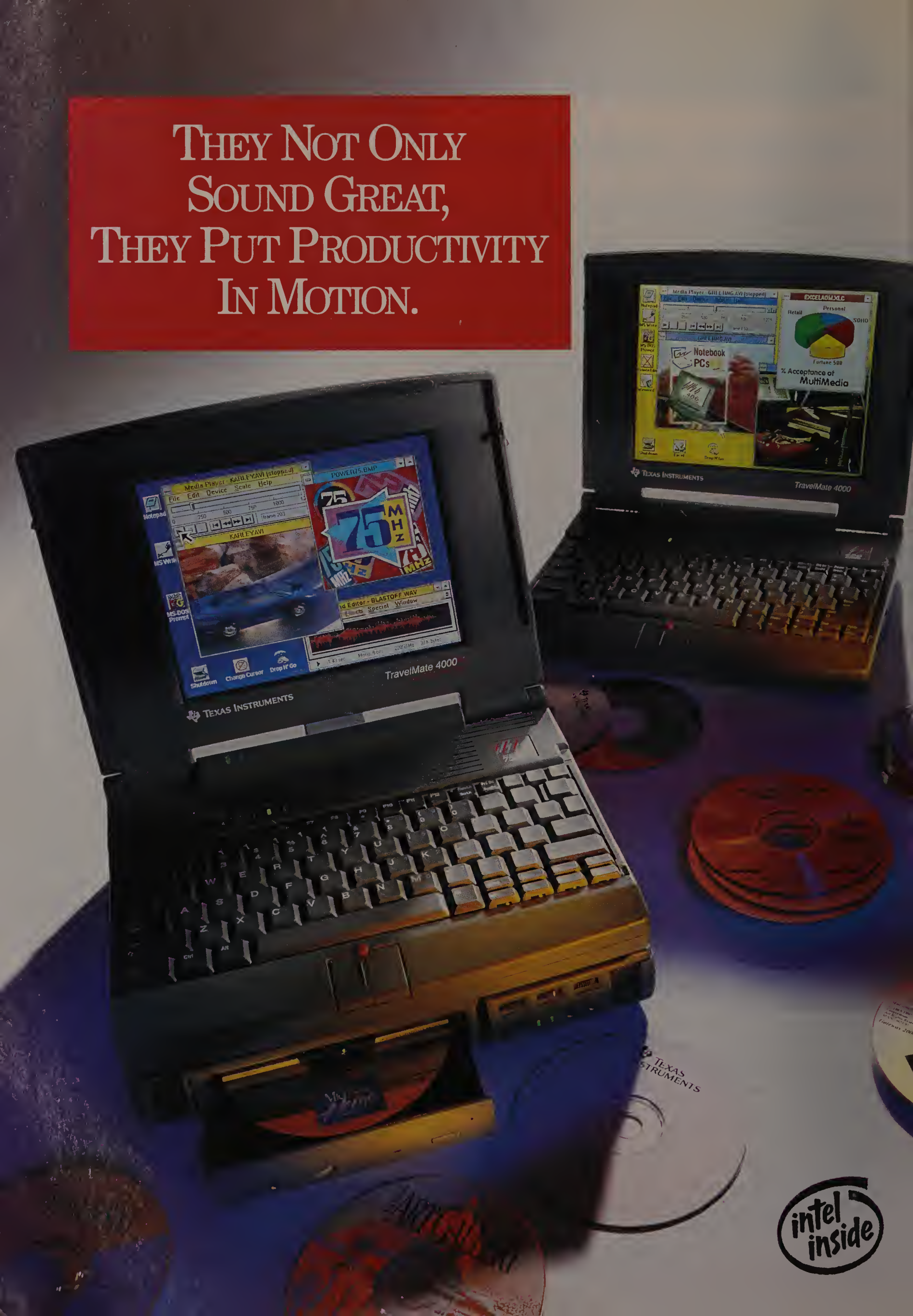

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July 1994

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Circle 220 on reader service card

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OF THE KIDS TO GRANDMA

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SureTrak Project Manager for Windows

From the makers of Primavera Project Planner, a high-end project management package, comes SureTrak, a less-expensive product that will suit many managers just fine. Expected to sell for around $350, SureTrak provides all the analytical tools, graphics, and reports necessary for project planning. The software is packed with features yet seems reasonably easy to navigate. Its expandable outline system lets you track projects by area, phase, date, and so on. SureTrak includes extensive reporting capabilities, and its Progress Spotlight highlights all projects from the past week or month. The program lists for $695. Primavera Systems, 800/423-0245, 215/667-8600.

Reader service no. 836

RemotePoint

This cordless handheld pointer from Interlink Electronics is designed for business presentations and multimedia applications. It consists of two hardware components: an infrared transmitter and a receiver. The transmitter is a pointer that fits comfortably in the palm of your hand; just point it at the receiver to move the cursor. It runs on two AAA batteries and uses a power-saving sleep mode to extend battery life. The receiver plugs into the computer's serial or PS/2 mouse port and includes its own DOS and Windows mouse drivers. The RemotePoint transmitter can be used up to 40 feet away from the receiver, making it useful for PC-based presentations. RemotePoint lists for $199. Interlink Electronics, 805/484-1331, 805/484-8989 (fax).

Reader service no. 837

WIRELESS MOUSE FOR PRESENTATIONS: Interlink Electronics' RemotePoint is an infrared pointer with a range of 40 feet.

Maximizer Sales Suite for Windows

Built around Modatech Systems' Maximizer contact manager, this application suite is designed for salespeople. It features a word processor, MapLinx (mapping software), Crystal Reports (a database report writer), and FaxWorks (a fax utility). Thanks to the bundled version of MapLinx, Maximizer is the only contact manager we've seen with mapping capabilities. Street priced at around $200, it has all the calendar and to-do list features you'd expect. Although networkable, Maximizer Sales Suite can be hard to use. For instance, it handles group scheduling but doesn't provide pop-up notices of meetings. Instead, the invitations show up unannounced in your calendar. And Maximizer Sales Suite doesn't allow you to attach documents to your contact names. The application suite lists for $379. Modatech Systems, 800/804-6299.

Reader service no. 838

Mitsubishi G2700-10U Color Printer

Mitsubishi's new color printer features a thermal wax technology that prints on plain paper and transparencies. By comparison, most thermal wax printers require expensive coated paper, thus making color printing a financial as well as an artistic decision. Compared to most low-end ink jet color printers, the G2700-10U is expensive, but its thermal wax technology produces better-quality color output. Another plus: It prints in color at the rate of 1 page per minute—three times as fast as typical color ink jet printers. If you need high-quality color output for presentations, the G2700-10U is worth a look. Measuring 14.1 by 10 by 5 inches, this printer is small enough to fit on most desktops. It lists for $1195. Mitsubishi Electronics America, 800/889-8439, 908/563-9889.

Reader service no. 839

GoldMine 2.5A for Windows

Thanks to its new "agent" technology, GoldMine can automate many business-related tasks—a capability that sets it apart from other networkable contact managers. You set up the rules and triggers, and GoldMine does the dirty work. For instance, you can put all your sales prospects in a "track," then tell GoldMine to fax a follow-up letter to anyone listed in that track, say, three days after a sales call. GoldMine not only keeps track of meetings and documents that relate to a contact name, but it also tracks all relevant E-mail messages. The program provides group scheduling and sales automation features. The remote synchronization feature helps you keep track of frequently updated documents on your work and home PCs. GoldMine is worth considering if you need a powerful, networkable contact manager. The single-user list price is $295. Elan Software, 800/654-3526.

Reader service no. 840

Font Works 1.5 for Windows

If you've ever uttered the words "So many fonts, so little disk space," Font Works is for you. When you open a document, Font Works analyzes its fonts. If they're not present on your machine, Font Works instantly generates high-quality look-alikes. The fonts take up very little disk space (152 of them consume less than 1.5MB). Equally important, Font Works guarantees print consistency: Documents look the same regardless of what printer is used. For workgroups that need to share documents across networks, Font Works can reside in any of three places: on an individual PC, in a shared directory on a network server, or in a reserved network directory. Users can access local and shared fonts anytime. Street prices are $49.95 for a single user and $225 and $850 for 10- and 50-user packs, respectively. ElseWare Corp., 800/357-3927, 206/448-9600.

Reader service no. 841

Jazz Speakers With SRS

Jazz, Inc.'s new high-end multimedia speakers feature built-in SRS technology, which creates 3-D surround sound from any stereo signal. New models include the J-521S, J-591S, and J-688S, as well as the J-707S, which we tested. Street priced

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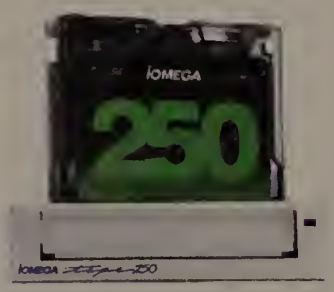

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PC WORLD WORLD CLASS 1994

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intel inside

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a full-sized keyboard,

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a battery you could buy almost anywhere,

all in an affordable, 5.9-pound package

that glides into a desktop docking base?

We thought so.

COMPAQ

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below $250, the J-707S speakers are housed in attractive wood cabinets and feature a 5-inch cone woofer and a 2-inch dome tweeter. As desktop multimedia speakers go, the J-707Ss are giants, measuring roughly 14 inches tall and 7 inches deep. While these behemoths are overkill if you define *multimedia* as the sound you hear when Windows loads, they could come in handy for multimedia developers or hard-core gamers who demand top-notch sound. Jazz, Inc., 818/336-2689, 818/336-2489 (fax).

Reader service no. 842

MediaStudio

MULTIMEDIA MediaStudio is a CD-ROM full of integrated video, audio, and graphics tools for creating and editing multimedia presentations. The program lets you arrange video and sound clips over an on-screen Timeline, then pick from 26 transition effects to segue from one clip to another. To review your work, simply play it back on MediaStudio's Scratch Pad. You can touch up each frame with the Image Editor, make animated transformations with the Morph Editor, or remix sounds with the Audio Editor. You can save your video creations as either Windows AVI or QuickTime files. And you can convert images from one file format to another—any of the more than 40 supported by MediaStudio. The program sells for $349 and includes over 650MB of video and audio clips. You'll need a Windows PC with a double-speed CD-ROM drive. Ulead Systems, Inc., 800/ 858-5323.

Reader service no. 844

MEDIASTUDIO'S VIDEO EDITOR gives you the tools you need to quickly build powerful multimedia presentations.

Panasonic PFC

Panasonic's new PFC is a multifunction device combining a laser printer, plain-paper fax, and copier. As a printer, it's standard issue, low-end: 4 ppm, 300 dpi, with an input tray that can handle 70 letter- or legal-size sheets. As a fax machine, it's a 9600-bps device that uses your existing phone line and has a built-in phone/fax switch that automatically routes voice calls and incoming faxes. As a copier, it scans and prints the first copy in about 40 seconds, then produces subsequent copies at the printer's 4-ppm rate. The copier and fax device share a 10-page document feeder and a 200-dpi scanner. The PFC is street priced at around $800. Panasonic Communications and Systems, 800/742-8086.

Reader service no. 843

SyncMaster GL Monitors

Samsung's new 14-, 15-, and 17-inch SyncMaster GL monitors deliver improved image quality and energy efficiency. The top-of-the-line 17GLs monitor (list price $949), designed for high-end graphics applications, offers color control, on-screen programming, and a specially coated screen for improved brightness and focus. The monitor boasts an excellent .26mm dot pitch and provides 1280 by 1024 resolution at 76 Hz. A less-expensive 17-inch model, the 17GL (list price $849), has .28mm dot pitch and 1024 by 768 resolution at 76 Hz. The 14- and 15-inch GL monitors ($399 and $560, respectively) provide .28mm dot pitch and support 1024 by 768 resolution at 76 Hz. The SyncMaster GL monitors are Energy Star compliant (conserving energy) and include a power management system with standby and suspend modes. Samsung Electronics America, 800/933-4110, 201/ 229-4000.

Reader service no. 847

DataFire ISDN LAN Adapter

Typically, PC users who work at home or in branch offices use modems to hook up with the main office. But a newer, faster alternative is the ISDN LAN adapter, which offers data throughput of up to 128 kilobits per second (kbps)—much faster than the 28.8-kbps performance (without data compression) of today's speediest modems. While ISDN adapters still cost more than most modems, prices are dropping steadily. DigiBoard's new DataFire ISDN LAN adapter is $595 and incorporates an ethernet adapter, which means you won't have to install a separate LAN card in the remote PC. The product also includes an NT1 line terminator (required for ISDN connections) and a power supply. However, you'll need to install an ISDN line both at the remote site and at the main office. (Installation typically costs about $150.) DigiBoard, 800/ 344-4273.

Reader service no. 846

1-2-3 Release 4.0 for DOS

Lotus's latest version of 1-2-3 for DOS offers a variety of Windows-like improvements, including a new graphical user interface with scroll bars, dialog boxes, and a status bar; a tutorial; a spelling checker; and more. Its new SmartIcons provide point-and-click access to popular features and should be familiar to users of Lotus's Windows programs. If you prefer 1-2-3 for DOS's traditional character-based interface, you can turn off the new graphical features. The new Cell Notepad utility lets you attach a comment to any spreadsheet cell, and the Column Fit-Widest command helps you instantly adjust column widths to accommodate the widest entries. According to Lotus, release 4.0 maintains file, keystroke, style, and macro compatibility with all previous DOS versions of 1-2-3. The program lists for $495; upgrades are $129. Lotus Development, 800/343-5414, 617/577-8500.

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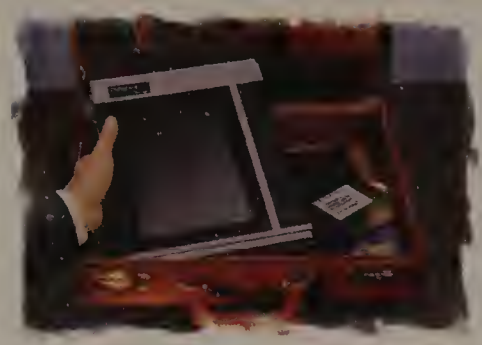
For more information about any product, contact the manufacturer or circle the number on the reader service card.



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	AcerNote 780cx	Toshiba T4800CT
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Battery Life:	NiMH/3 hrs. max	NiMH/2.5 hrs. max
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PCMCIA:	2 Type II or 1 Type III	1 Type II or Type III
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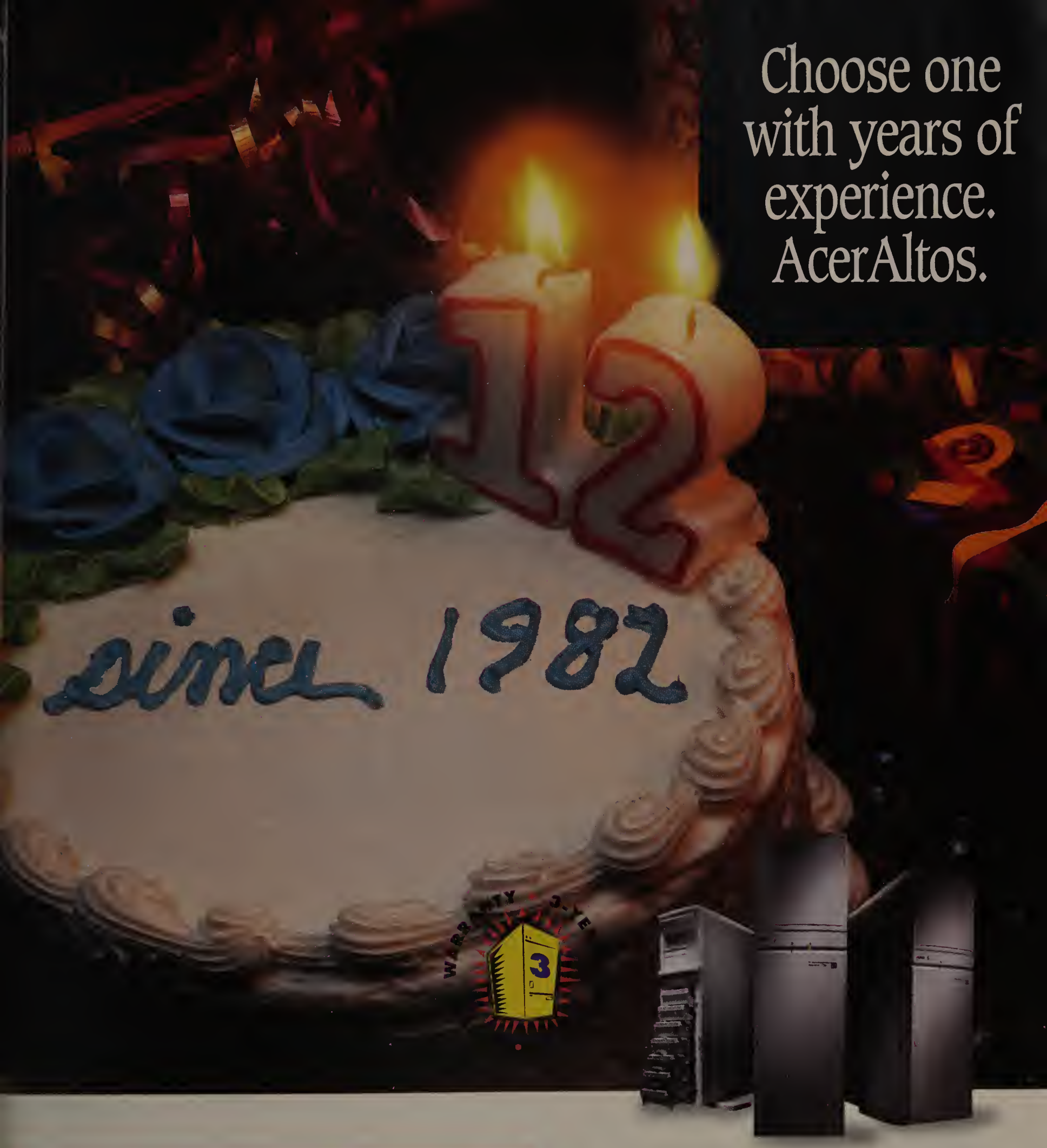

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Best CDs of '94

Gifts on a Silver Platter

There will be 12 million multimedia computers on people's desks by the end of 1994, so it's no surprise CD-ROM titles are racking up a whopping $3.7 billion in sales. However, the sheer number of titles—on just about every subject imaginable—makes deciding which ones to buy all the more difficult.

Whether you're buying a CD-ROM for your own use or as a gift for someone else, judging which is the right game, the perfect multimedia encyclopedia, or the best information-entertainment package requires more criteria than the flashy package design or the dazzling descriptions printed on the box can provide.

This year the editors at *PC World* popped the shrink-wrap and auditioned hundreds of CD-ROM packages. On the pages that follow, we offer a buyer's guide to the best of the CD-ROMs that came our way, that we saw, and that conquered us for one reason or another. You'll find our favorites here, and still more on PC World Online. These are the gifts that not only come *on* a silver platter, they *are* the silver platter.

EDITED BY MICHAEL S. LASKY

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GORDON STUDER

Best CDs of '94

GAMES AND LEISURE

Baseball's Greatest Hits

Voyager Company, $49.95, 800/446-2001

Sure, it's got statistics. But Baseball's Greatest Hits' true talent is its ability to evoke the sounds and texture of the game. Featuring more than six hours of interviews with the likes of Cool Papa Bell, Ty Cobb, and Cy Young; original radio broadcasts; and commentary by sportscaster Mel ("How 'bout that!") Allen, this disc invites you to close your eyes and relive baseball history. Or keep 'em open for the photos, the stadium pictures, a trivia game, and some of the most colorful baseball journalism ever, courtesy of sportswriter Red Smith. Also not to be missed is a dugoutful of video, from Lou Gehrig's tear-jerking farewell address to a newly discovered home movie of Babe Ruth's legendary "called" home run in the 1932 World Series. A treat well worth $49.95. —*Steve Fox* **Reader service no. 620**

Falcon Gold

Spectrum Holobyte, $79.95, 800/695-4263

If you're serious about flight simulators, you'll lock right on to Falcon Gold, which packs three popular games into a single disc. The Falcon 3.0 F-16 simulator is augmented by the Hornet Naval Street Fighter and the Mig-29, which put you into the cockpit of the U.S. Navy's premier strike platform and Russia's most feared multirole fighter, respectively. You can drive your F-16 Falcon against ground targets in Bosnia-Herzegovina or land your F/A-18 Hornet on a carrier in the Sea of Japan. Falcon Gold also includes Art of the Kill, a tutorial on fighter tactics. While Falcon Gold is great for trainees and grizzled veterans alike, new users may find the program's War Room interface and complex controls challenging. —*Michael Desmond* **Reader service no. 622**

Gabriel Knight: Sins of the Fathers

Sierra On-Line, $69.95, 800/743-7725

Gabriel Knight is a hard-edged New Orleans author writing a book on voodoo. He's also a cynical, skirt-chasing ne'er-do-well, which provides much of the humor in this interactive CD-ROM adventure. When Gabriel's not trading barbs with his sarcastic and brainy assistant, Grace, he's roaming the French Quarter, investigating a series of mysterious voodoo murders to which he is inexplicably drawn. While the game's low-resolution graphics won't knock your socks off, Gabriel Knight's witty dialogue and adult subject matter make it far more compelling than the average interactive fare. In addition, it boasts a cast of Hollywood actors in the voice-over leads—Tim Curry, Leah Remini, Mark Hamill, Efrem Zimbalist Jr., and more. A 20-minute video on the making of this disc is also included. —*Jeff Bertolucci* **Reader service no. 623**

Gettysburg Multimedia Battle Simulation

Swfte Int'l/Turner Interactive, $69.95, 800/237-9383

I've read two novels and numerous histories about the Civil War battle in which fortune turned against the Confederacy, but this disc gave me a much better grasp on exactly what happened on those three hot days in July 1863. Beginning with a suitably dark-toned introduction narrated by Civil War authority Shelby Foote, the disc incorporates a handful of good, very-small-screen clips from this year's Hollywood film.

But its centerpiece is a satisfying simulation of the battle on either terrain or a historical map of the Pennsylvania countryside. You can sit back and watch icons of the Union and Confederate forces maneuver and fight, all while listening to (or reading) Foote's commentary. Or try commanding one or both sides. Marching your forces around, choosing when to engage and disengage, you aim the artillery, study your troops' condition, and find out if 131 years' hindsight allows you to out-general Robert E. Lee and Union commander George Meade. —*Eric Bender* **Reader service no. 624**

Microsoft Golf Multimedia

Microsoft Corp., $49.95, 800/426-9400

At Microsoft Country Club, there are no greens fees, no wait times, and no ducking rogue balls as other golfers yell "Fore!" You can test your skill on a number of digitized courses, rendered from photos of real ones, with high-res graphics that approximate trees, rough, and greens. All the sound effects are just right, from the whoosh of the five iron to the clop of the putter, and the full-motion video follows the arc of the ball. This is the most realistic PC sports simulation I've ever seen. The only things missing from it are the golf cart and the caddy. — *Michael S. Lasky* **Reader service no. 625**

Microsoft Complete Baseball

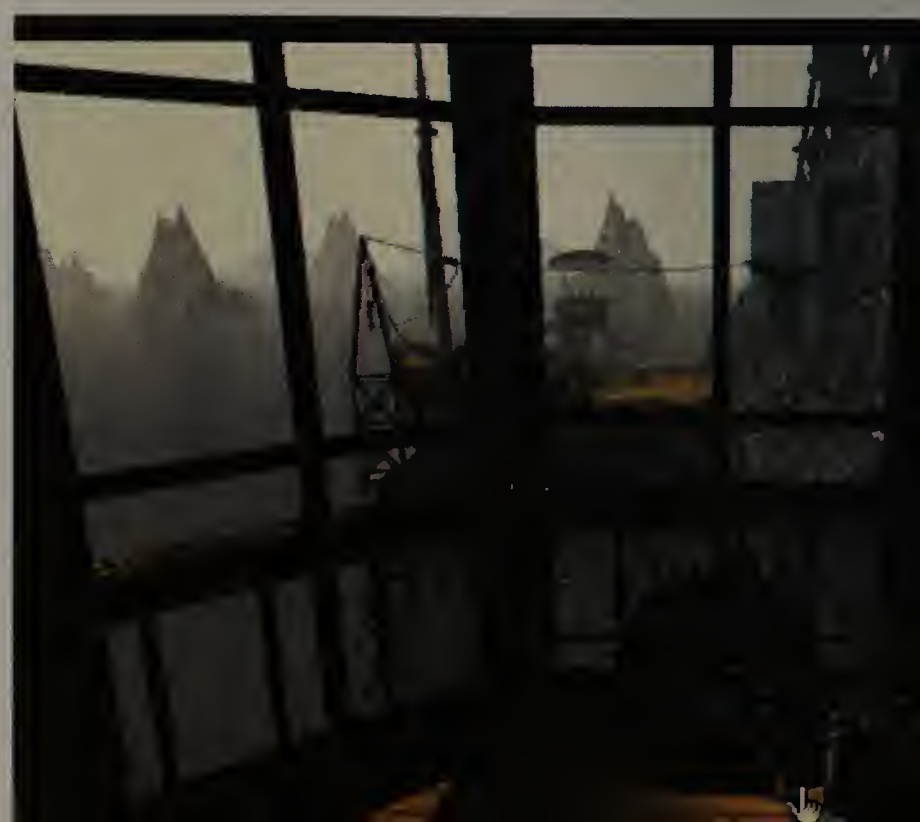
Microsoft, $59.95, 800/426-9400

Microsoft Complete Baseball is the definitive CD-ROM for obsessive fans (like me), who wake up in the night wondering what Mario Mendoza hit in 1979 (.198), or who led the 1901 Detroit Tigers in wins (Roscoe Miller, with 23). True to its name, Complete Baseball sports complete career stats for every major leaguer who ever played, plus thousands of photos, scores of audio clips, a dozen videos, a trivia game, and historical essays. The text is rich with hot-linked cross-references, so one click can propel you on an endless trail of inquiry. And for the most up-to-date stats, fire up your modem and download Baseball Daily, a compilation of the previous day's scores, standings, schedule, and the like. It's a clever idea, but at $1.25 a pop I'll settle for my local paper. —*S.F.* **Reader service no. 626**

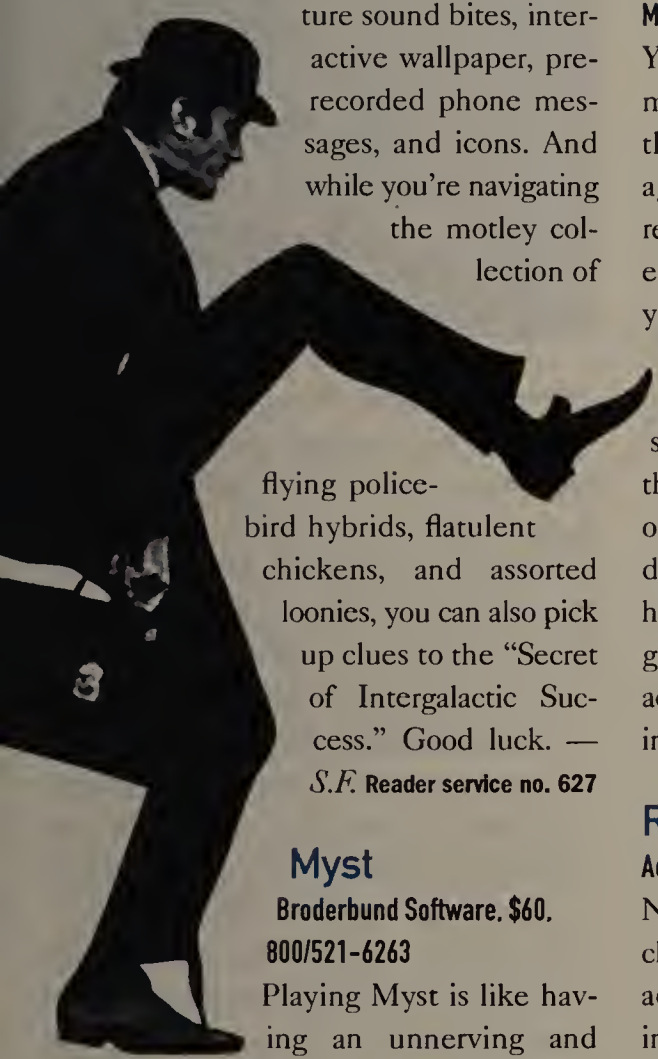
Monty Python's Complete Waste of Time

7th Level, $60, 214/437-4858

And now for something completely different: an aptly named detour through the warped logic of the collective Python brain.



Visit the Exploding TV Room, the Portrait Gallery, and other demented sites to unleash 30-plus video clips from the original TV show (the "Dead Parrot" sketch, "Nudge Nudge Wink Wink," and more), hours of animation, songs (including "Spam" and "I'm a Lumberjack"), absurd arcade-style games, and of course, abuse ("Did someone tell you to click here?"). A Desktop Pythonizer module includes signature sound bites, interactive wallpaper, prerecorded phone messages, and icons. And while you're navigating the motley collection of flying police-bird hybrids, flatulent chickens, and assorted loonies, you can also pick up clues to the "Secret of Intergalactic Success." Good luck. —*S.F.* **Reader service no. 627**



Myst

Broderbund Software, $60, 800/521-6263

Playing Myst is like having an unnerving and strangely beautiful dream. Aside from the puzzles and the revealed-as-you-go plot, the most involving part is the world itself, a surreal mixture of technology and natural settings. Every scene has an integrity that makes it believable, whether you are navigating underground tunnels or climbing through creaking tree houses. The sounds—wind, water, haunting music—draw you further into the game's reality. Myst may seem daunting at first: The worlds you move through are disconcertingly uninhabited. Aside from an occasional bird, nothing moves until you interact with it. Solving the puzzles requires logic and sometimes extreme patience, but you'll be rewarded with a compelling and complicated story with several possible endings. The sheer audaciousness and beauty of Myst make it a singular masterpiece. —*Heidi Wolff* **Reader service no. 628**

The Psychotron

Merit Studios, $59.95, 800/238-4277

You're the star of this interactive murder mystery, playing a CIA operative tracking the mole who caused the deaths of four agents sent to Russia to retrieve a mind-reading device called the Psychotron. It's an entertaining scavenger hunt that will have you tracking down clues, opening secret doors, and cracking vaults to solve the mystery. Mostly mouse-driven, the game starts with bird's-eye 3-D views of offices, then zooms in so you can click on specific objects. Along the way, you'll encounter dozens of live-action videos—with acting so hammy you may laugh out loud. There are games within the game, and enough interactive decisions to make for repeated playing.—*M.S.L.* **Reader service no. 629**

Return to Zork

Activision, $79.95, 800/477-3650

Not only does Activision's Return to Zork claim one of the noblest pedigrees in quest adventure gaming, but it combines a slick interface with some of the wickedest puzzles this side of enigma. Like its text-only ancestor from the 1980s, this Zork shoves you into an underground world filled with magic and frequent dead ends. The video and audio extras—in which actors now fill the animated characters' roles—nicely update the quest experience, especially in the MPEG version, which requires a ReelMagic board. But the real reason to Return to Zork is as old as adventuring: the devilish puzzles. You've got to search for clues *everywhere*, collect *everything* you can get your hands on, then spend hours figuring out what goes where. Zork's not for newcomers, but vets will find it a welcome replay of the past. —*Gregg Keizer* **Reader service no. 631**

Sam & Max Hit the Road

LucasArts Entertainment, $59.95, 800/782-7927

He's a wet-nosed gumshoe from Brooklyn. His partner, well, let's just say he's one wisecracking bunny with size 14 feet and

TOP 10 FAVORITES OF '94

By Michael Goodwin
PC World *columnist*

1. I Photograph to Remember
A moving meditation on family and the power of memory, based on 100 black-and-white Pedro Meyer photographs. *Voyager Company*

2. Indiana Jones and the Fate of Atlantis
The most cinematic computer game I've ever played. *LucasArts Entertainment*

3. Library of the Future, Third Edition
From *Hamlet* to Sherlock Holmes, 3500 novels, stories, essays, poems, religious texts—all fully searchable. *World Library*

4. Math Workshop
Bowling gorillas and boogie-woogie music demystify basic arithmetic for children ages 6 to 12. *Broderbund Software*

5. Microsoft Multimedia Stravinsky: The Rite of Spring
Spectacular music accompanied by synchronized annotation and commentary helps define multimedia. *Microsoft*

6. Myst
A surrealistic combination of near photo-quality graphics, haunting music, and sound effects. *Broderbund Software*

7. The Oxford English Dictionary
Fully searchable, and easier to use than the print version. *Oxford University Press*

8. PhoneDisk PowerFinder
Easily the best CD-ROM phone directory you can buy, and fast, too. Now available in Windows or DOS versions. *Digital Directory Assistance*

9. ♀ Interactive
This is a unique combination of music videos, animation, game-type puzzles, and six Prince songs. *Graphix Zone*

10. Sam & Max Hit the Road
An introspective hound dog and a buzz saw disguised as a fuzzy bunny star in a postmodern adventure-comedy. Surrealism is alive and well. *LucasArts Entertainment*

ears to match. Welcome to the offbeat world of Sam & Max Hit the Road, where the sleuths are furry, life is cheap, and the broads have names like Trixie. The goal: to solve the mystery of the hijacked Sasquatch. You direct the freelance police, otherwise known as Sam (the dog) and Max (a "hyperkinetic rabbity thing"), through an ingeniously complex maze of mysteries, taking colorful detours through the seamy demimonde of an old-time carnival, some roadside burger joints, and other kitschy tourist attractions. Until you have bungee-jumped from the nostril of George Washington at Mount Rushmore, you haven't lived. Arch humor, stylish film-noir graphics, hard-boiled dialogue, and Sam Spade ambience pervade this funny and consistently entertaining mystery game. Vexing enough to keep teenagers or sufficiently juvenile adults scratching their heads—and Max, his fleas. —*Leslie Crawford* **Reader service no. 632**

Theme Park

Electronic Arts and Bullfrog Productions, $59.95, 800/245-4525

"If you possess the skills required to make people happy while simultaneously taking them for as much money as possible, read on." Donald Trump himself couldn't resist a come-on like the one that launches Theme Park. In this test of entrepreneurial skill, you design a theme park, right down to the loops of the roller coaster and the location of the concession stands. (Hint: Don't place them next to the roller coaster.) Your goal is to make as much cash as you can, so go ahead, "fix" the games of skill. Move up to Theme Park's second level and you compete against other parks, do customer research, and handle labor negotiations. And be careful: If you skimp on guards, a gang of outlaw bikers may show up. When you reach the game's highest level, you sell shares in the company and try to become the hottest property on Wall Street. Your park will be rated against 40 different rivals in six categories, and you must take every category in order to win. Greed is good. —*Laurianne McLaughlin* **Reader service no. 635**

Vid Grid

Jasmine Multimedia/Geffen Records, $34.95, 800/798-7535

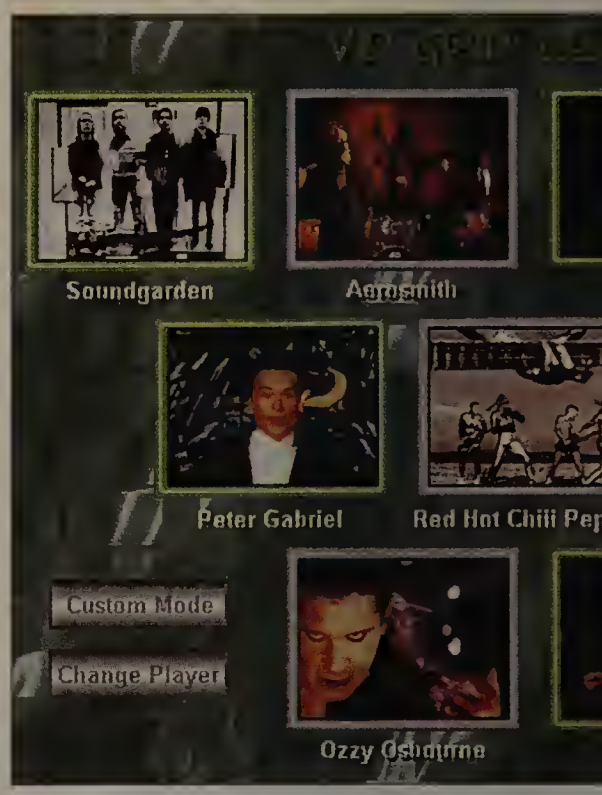
MTV for nerds! You may not like all these videos, but the game you play with them is addictive. As you watch one of nine rock videos (from Peter Gabriel, Aerosmith, the Red Hot Chili Peppers, and others), the screen fragments into a jigsaw mosaic. With your mouse, you try to drag the sections back into the correct order before the video finishes. It sounds easy, but it's not, especially when success guarantees an increase in the level of difficulty. A clock tracks your progress and a solve button lets you view the videos unscrambled.

The featured videos rate high on originality, and Gabriel's "Sledgehammer" is an award-winning classic. Additional video modules will be available in time. Finally, these videos are more smooth-playing and visually crisp than any others I've yet seen in Windows. —*M.S.L.* **Reader service no. 636**

Way Cool Too Games for Windows, Just for Kids Cyberdelic Screen Savers

Quantum Axcess, $19.95 each, 800/867-4890

Quantum Axcess is a little company in Ohio that puts out big discs filled to overflowing with shareware and freeware Windows programs. What separates its discs from the legions of shareware competitors is the



obvious care that's gone into selecting the contents. On top of that, you get a way-cool proprietary search engine that lets you run most of the programs straight off the CD-ROM *before* installing to your hard disk. Way Cool Too is the second edition of the successful Way Cool Games for Windows, and it includes more than 200 games. Just for Kids compiles 75 learning programs and educational games for various age groups. Cyberdelic Screen Saver's play-before-you-install option buys your hard disk temporary freedom from megabyte-robbing screen saver modules. And check out the prices—these discs are easily the best bargain in this review. You must send in registration fees for any shareware you do decide to keep, of course. —*M.S.L.* **Reader service no. 637**

ARTS AND CULTURE

Microsoft Art Gallery: The Collection of the National Gallery, London

Microsoft, $59.95, 800/426-9400

No armchair art lover will want to miss this chance to browse the halls of London's National Gallery from the desktop. As you contemplate exquisite pictures from da Vinci to Van Gogh, a curator with a distinguished voice provides valuable insights, narrates artists' bios, and reveals the mysteries of their paintings. Animated sequences depict restorations, demonstrate artistic perspective, and explain composition. Explore Art Gallery via four pathways: Artists, Historical Atlas, Picture Types and General

Reference. Art history doesn't have to be just a lecture. —*Valerie Singer* **Reader service no. 639**

Microsoft Cinemania '95

Microsoft, $59.95, 800/426-9400

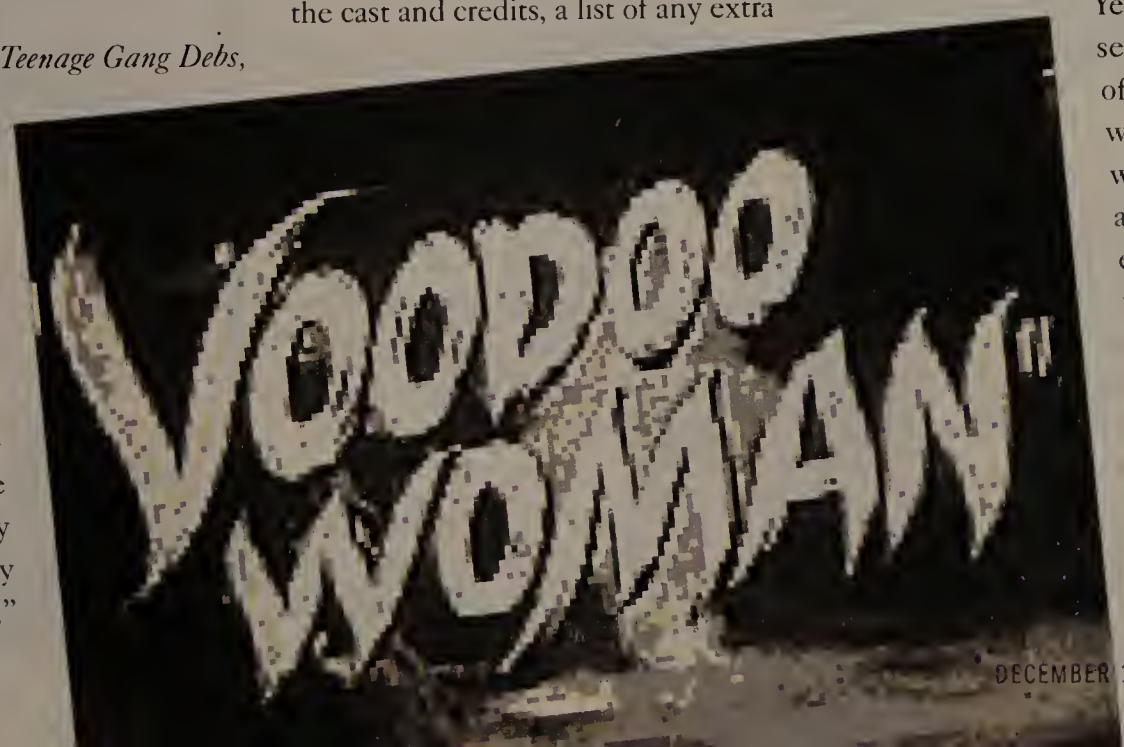
Microsoft Cinemania is a film buff's hog heaven. Surprisingly, of all its multimedia bells and whistles, the 20 video clips, 30 to 90 seconds each, are the disc's *least* interesting components. Each one of the 20,000 films listed has a matching review by either Roger Ebert, Pauline Kael, or Leonard Maltin. The complete texts of Ebert's *Video Companion*, Kael's *5001 Nights at the Movies*, and Maltin's *Movie and Video Guide 1994* are included, each overflowing with hypertext links: Click on a title to find out the film's MPAA rating, its running time, any awards it received, and its availability on video.

You can find films by searching categories for actors, directors, genres, dates, and so on. In the text of a review, click on the name of an actor or director, and the appropriate bio will appear, complete with a filmography. Combine this information powerhouse with the film clips, hundreds of audio clips, nearly 1000 movie stills, and the complete text of Ephraim Katz's classic *Film Encyclopedia*, and you've got at least three or four thumbs up. —*M.S.L.* **Reader service no. 640**

Classic Clips

Starlite Productions, distributed by ASG, $49.95 each, 314/965-5630

Devil Girl From Mars, Teenage Gang Debs, and *Wild Women of Wongo* are just some of the inhabitants that you'll encounter when you watch the hysterical "Vicious Vixens" disc, one of four CD-ROM compilations of campy, so-bad-they're-good bargain matinee movie trailers. You say you want culture? Try "Trailers Spectacular," which announces coming attractions from *The African Queen* to *The Maltese Falcon*. The other two discs are devoted to horror and sci-fi previews, dating from the golden age of cinema, when previews of coming attractions were usually as enthusiastic as they were inaccurate. Movies were often hyped as fabulous even when the trailers make it obvious that the films must have been unadulterated stinkers. Despite the poor condition of most of the source material, the video transfers seem surprisingly good. Watch them in any order with the clip director, or load them with the Movie Time screen saver included with each title, then thank the stars in the Hollywood Walk of Fame that some of these trailers still exist at all. —*M.S.L.* **Reader service no. 641**



Criterion Goes to the Movies

Voyager Company, $24.95, 800/446-2001

Here's a CD-ROM catalog of more than 150 movies—old, new, serious, and fun—drawn from the Criterion Collection of laser discs, the champagne of home video. Boasting top-notch digital transfers and rare supplementary material such as outtakes and script excerpts, they are among collectors' favorites.

The CD-ROM gives you plenty of information on each film, including a clip in the original release's wide-screen aspect ratio, the cast and credits, a list of any extra value-added features on the laser disc, plus the liner notes from the disc's jacket. And to tempt you to spend more money later, you receive four coupons, each good for 25 percent off a title purchased directly from Voyager.—*Lincoln Spector* **Reader service no. 642**

Library of the Future, Third Edition

World Library, $149.95, 800/443-0238

If you appreciate classic literature, you'll want Library of the Future. This single disc contains the complete text of 1750 novels, volumes of poetry, scientific documents, plays, and some religious works—from A to Yeats. Best of all, you can search the entire contents of the disc for specific words or phrases, locate works according to the author's nationality and era, copy and print text, view line drawings, or even watch one of a dozen video clips—for example, an amusing scene from the 1938 film version of George Bernard Shaw's *Pygmalion*. Who says CD-

BONUS

MORE TOP TITLES REVIEWED ONLINE

An expanded version of this roundup is available exclusively on PC World Online on CompuServe and America Online. In addition to the entire text of this article, we've included reviews of many more of the year's top discs. The reviews available only in the online version include LucasArts Entertainment's Rebel Assault, SoftKey International's American Heritage Talking Dictionary, Medio Multimedia's Jets, Interplay's Sim City, Voyager's Poetry in Motion, Sumeria's OceanLife, Microsoft's Dangerous Creatures, Time Warner's Aegis: Guardian of the Fleet, and Spectrum Holobyte's Tetris Gold. Also included are reviews of six of the best CD-ROMs for kids, advice for buying children's software, a roundup of CD-ROM magazines, and much more. To read or download the expanded version of this article on America Online, use the keyword PCWORLD to go to the PC World forum, and look for the CD-ROM icon. On CompuServe, use GO PCWORLD and select *Current Issue*.

ROMs will kill books? This disc is a worthwhile addition to any book lover's shelf. —*James A. Martin* **Reader service no. 643**

QuickTime: The CD 1994

Sumeria, $49.95, 800/478-6374

This two-disc set features over 50 prize-winning short films—from six-second masterpieces to seven-minute epics—drawn from the 1994 International QuickTime Film Festival, held in Tokyo and San Francisco. The collection draws from a wide variety of film categories, including animation, music videos, commercials, documentaries, educational, experimental, humor, and narratives.

A video browser makes for easy access, and while the size of the viewing window is relatively small, the video quality is exceptional. —*M.S.L.* **Reader service no. 645**

The Viking Opera Guide

Penguin Books/Attica Cybernetics, $99.95, 800/253-6476

An audio CD can hold 74 minutes of music. The mammoth Viking Opera Guide uses data compression to pack in more than *three hours* of musical excerpts—and that's just *part* of this bravura disc, which squeezes in all the text and photos from the accompanying 1300-page reference book as well. Music experts call the book version the most thorough volume on opera ever published. The CD-ROM goes it one better by offering a speedy and dynamic search engine that lets users browse by any word: composer, title, librettist, time period, location, and so on. A time line and a world map visually enhance the pursuit of opera history, lore, famed singers, and plot synopses. The musical excerpts make up a good selection of examples of particular operas, if not historically noteworthy performances. You don't need a great voice to sing the praises of this bravissimo disc. —*M.S.L.* **Reader service no. 647**

Wirehead: Virtual Media Galerie

Quantum Axcess, $29.95, 800/867-4890

Billed as "the world's first virtual gallery of computer art and animation," this disc brings you about as close to experiencing virtual reality as you can get without goggles. Each of four "floors" showcases the exquisitely rendered art and animation of up-and-coming artists who use computers to design and generate their images. Click on a picture hanging on the wall, and it comes sharply into focus. Select the zoom button and the image fills the screen.

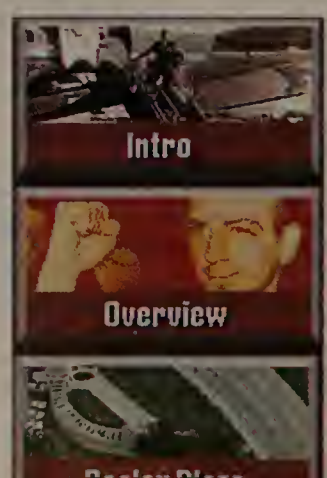
Listen to appropriately electronic music, scroll through boxes containing biographical information on the artists, and use the <Save> button to transfer your favorite pictures to disc as you tour this tastefully curated computer art exhibition. —*M.S.L.* **Reader service no. 648**

SCIENCE AND TECHNOLOGY

J.F.K. Assassination: A Visual Investigation

Medio Multimedia, $59.95, 800/788-3866

This disc represents a high-water mark among multimedia projects. In addition to the full text of the Warren Commission Report, plus two other books, *Crossfire*, by Jim Marrs (on which the Oliver Stone film is partly based), and *The John F. Kennedy Assassination: A Complete Book of Facts*, you get 30 minutes of full-motion video clips that



TOP 10 ENTERTAINMENT TAKE 1

By Gregg Keizer
Gaming expert

1. Myst
One of the few gotta-get games that doesn't pander to kids with itchy trigger fingers. *Broderbund Software*

2. Rebel Assault
***Star Wars* gets small and comes alive in a rollicking 3-D ride. Lots of action as you fly Skyships and cross swords with Darth Vader.** *LucasArts Entertainment*

3. Print Shop Deluxe CD Ensemble
Combining five individual packages, it's one of the best buys for family entertainment. *Broderbund Software*

4. Star Trek: 25th Anniversary
The aging actors' voices spice up an already engaging adventure and strategy game. *Interplay*

5. The Haldeman Diaries
Short audio and video clips plus complete diary text from the Nixon right-hand man enhance the story of one of the strangest presidencies ever. *Sony Imagesoft*

6. Return to Zork
This blast-from-the-past adventure offers a slick underground quest full of mean puzzles and live-action actors. *Activision*

7. The 7th Guest
Solve the mystery of Henry Stauf's haunted mansion in this semiscary game that's simple enough not to spook adventure rookies. *Virgin Interactive Entertainment*

8. Millennium Auction
In the not-too-distant future, art is entertainment when it's auctioned off by the glitterati. Cooler than Monopoly. *Eidolon*

9. J.F.K. Assassination: A Visual Investigation
A Dealy Plaza buff's dream. *Medio*

10. Microsoft Complete Baseball
Audio and video clips, exhaustive stats, and even a trivia test keep you in the game. *Microsoft*

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IDC Insight: An

Gaining Competitive Advantage

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If your company's mobile sales people, service reps, and other field employees routinely use mobile computers in their daily work, then your company may be gaining a significant competitive advantage.

This is the key finding of a recent survey of 400 large and medium-sized U.S.organizations conducted by International Data Corporation (IDC), the world's leading information technology market research firm.

Pursuing a competitive advantage requires investment and planning. Field force automation is more than just equipping sales or service people with the latest notebook computer and contact manager software package and hoping for the best. It requires a systematic approach to acquiring technology, training and supporting field personnel and writing or buying software.

This IDC Insight analyzes the experiences of businesses and government agencies already engaged in field force automation. IDC conducted in-depth telephone interviews with information systems professionals and field managers at companies from a variety of industries.

Key findings are recapped in the sidebar. An in-depth summary of the survey is available in a special *IDC White Paper on Field Force Automation* (see box, bottom far right).

For companies that make the commitment in time and money to field force automation, the payoffs are real.

Key Findings

- Over 70% of large and medium-sized organizations are in some phase of field force automation.
- Field force automation is not new for most companies. Over a fifth of those polled were in their third generation of field force automation.
- The key benefits came from productivity improvements and better customer service.
- Key success factors include top management support, training, and a good working relationship among the departments involved.
- The biggest impediments to successful implementation were resistance to change on the part of the sales force and flagging top management support.

Going for the Brass Ring

Automating a field force is no easy task. Nor is there a single standard for systems development—applications can be as simple as providing e-mail support for sales people or as complex as custom-built applications that interface mobile computers with corporate databases.

But for companies that make the commitment to field force automation, the payoffs are real.

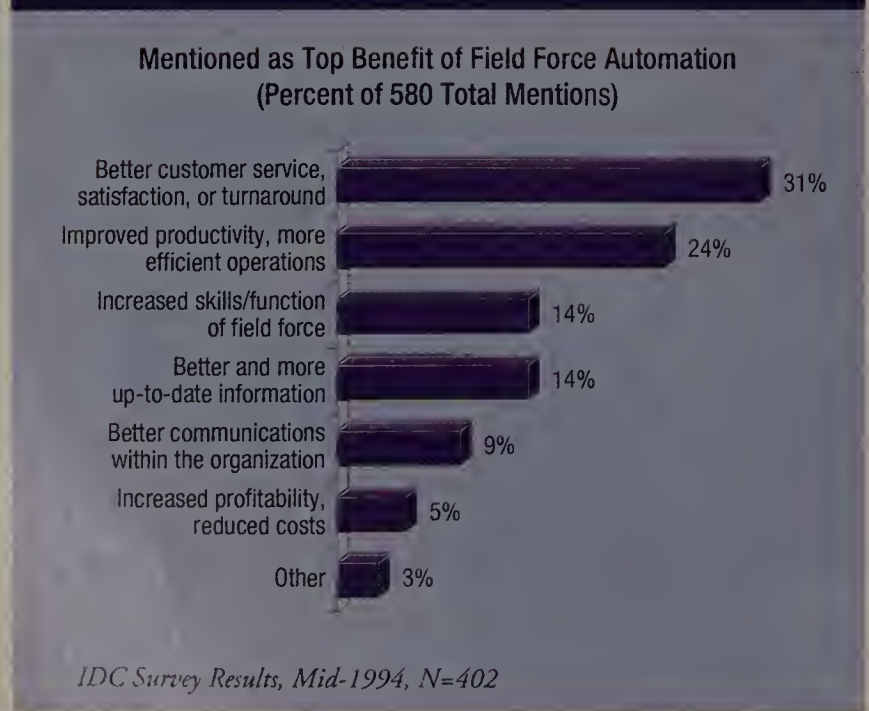
The benefits received by the organizations polled are quantified in Figure 1. Most come through better customer service, improved field force productivity, or more sophisticated or efficient field force operations.

Quantifying these benefits of field force automation requires a measuring stick, and the companies polled generally rated their success at field force automation, in ranked order, using:

- Internal productivity measures, such as transaction time, support headcount, or even sales quotas.
- Customer satisfaction benchmarks, e.g., formal customer evaluations, call handling statistics, or repeat business.
- Measurement of field force satisfaction using surveys as well as continued willingness to fund.
- Financial returns, such as increased revenues or profits or formal return-on-investment (ROI) calculations.

The ultimate payoff from field force automation should be sustainable competitive advantage. Here survey respondents gave automation a vote of confidence. Of the 42% that considered their automation efforts ahead of peer organizations, 63% felt that they had

Figure 1 — The Benefits of Field Force Automation



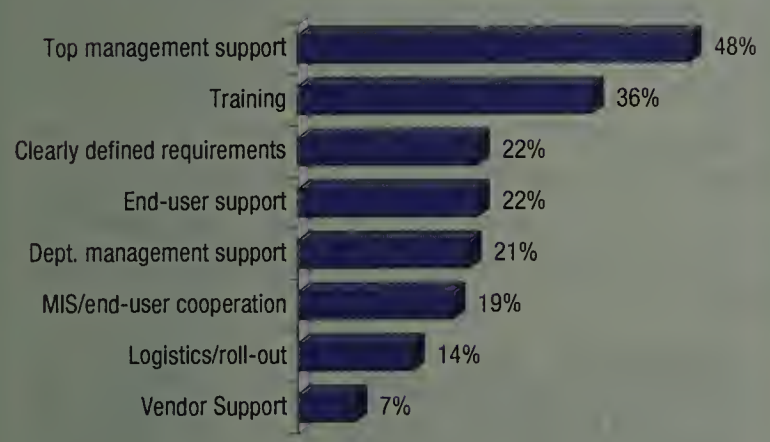
Executive Briefing

hrough Field Force Automation

omputer Corporation

Figure 2 — The Keys to Successful Field Force Automation

What to Pay Attention to in Implementation
(Percent of Leading-Edge* Companies Mentioning)



** Companies rating themselves as further advanced than competitors in field force automation and having a competitive advantage as a result*

IDC Survey Results, Mid-1994, N=94

gained a competitive advantage as a result. This advantage generally meant getting more bang for the buck out of the field force: more qualified leads called by sales people per day, shorter mean-time-to-repair for maintenance technicians, and less downtime for on-site auditors, programmers, or project engineers.

Critical Success Factors

IDC asked respondents who felt they had achieved competitive advantage through field force automation what they considered the critical success factors. Figure 2 ranks these factors.

The success factors are not surprising. But they point out the importance of selling field force automation to multiple constituencies and maintaining that support.

Respondents to the survey recognized the need to see field force automation as an ongoing process requiring continual investment and support to provide the maximum payback.

IDC believes that the ongoing nature of field force automation triggers yet another success factor: an organization's relationship with its supplier and its choice of technology. To support a mission-critical application like field force automation, organizations should consider the vendor of their mobile computers as a business partner—not a commodity supplier. This means evaluating the vendor on:

- System reliability
- System portability
- Availability and support
- Reputation and viability
- Technology replenishment

A well-chosen supplier understands the ongoing nature of field force automation and supports its customers with a long-term program for technology insertion and asset management.

The products need to be durable, easy to use, easy to network, and they need to support common operating systems. Battery life, screen quality, and industrial design will be crucial. Only after a vendor and its products fit these criteria should product price become a major factor.

The cost of the hardware, after all, is a small part of the total cost of implementation.

The Call to Action

The paybacks already achieved by companies using field force automation should motivate others to increase their automation efforts.

Automating sooner is better than automating later. Much of the success of field force automation relies on skills and experiences built over time; organizations not automating today run the risk of falling even further behind.

If there's a single message emerging from the research, and examined in *IDC's White Paper on Field Force Automation* (see below) it's this: Field force automation is no longer an experiment in technology. It's a mainstream way of doing business.

– John Gantz
Senior Vice President
International Data Corporation

Maintaining the Edge

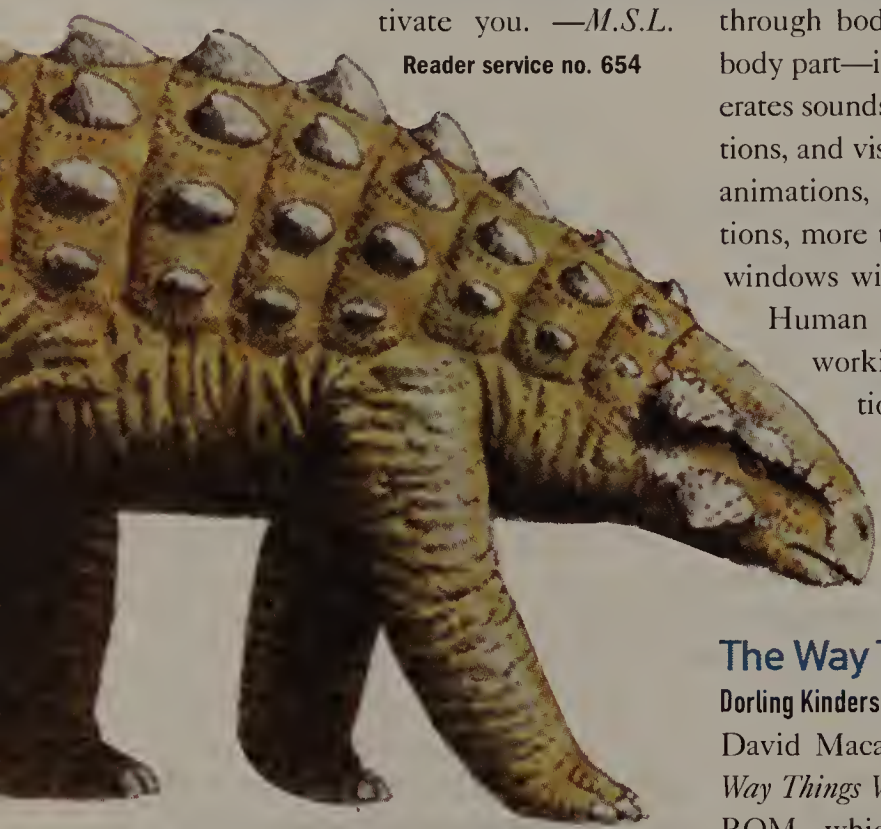
Once a field force automation application is up and running, success factors change. Leading-edge companies considered the following most critical:

- Continual upgrading of hardware and software: 31% of respondents.
- Continual investment in training: 25%
- Ongoing support for end users: 20%
- Management support: 16%

This Insight was written independently by IDC and sponsored by Dell Computer Corporation. For a complimentary copy of IDC's full White Paper on Field Force Automation, please call Dell at 1-800-396-3040.

Best CDs of '94

can be viewed in slow motion, or even a frame at a time. You also get computer-animated reenactments of the assassination, from various angles. The text is studded with hyperlinks for easy cross-referencing. Among the videos is the famous Zapruder film, but the disc contains some other little-known home movies that were also taken of the event. No matter what you think happened in Dallas on November 23, 1963, this provocative resource will captivate you. —*M.S.L.* **Reader service no. 654**



Microsoft Dinosaurs

Microsoft, $59.95, 800/426-9400

Microsoft Dinosaurs starts off with a roar—a catchy Mesozoic musical medley—and never loses your attention. You can delve into dinos by family, geography, and time line, or use a graphical index, meeting everything from an albertosaurus to a velociraptor and picking up lots of cool tidbits on the way. Guided tours to subjects such as "Dinosaur Pets" offer a lighter introduction to beasts like the pinacosaurus, a 14-foot "animated pincushion." A picture gallery lets you copy or print your favorite dinosaur's picture, and you can even make your own dino Windows wallpaper. Slickest of all are six animated movies, which make excellent use of Windows' limited motion-video capability. Written text is snappy, and the package deftly exploits voice-overs and music clips. Dinosaurs is narrower than Grolier's Prehistoria, which covers everything from (primordial) soup to (Cro-Magnon) huts, but it's also incomparably livelier. It even dragged my three-year-old daughter away from Barney. —*E.B.* **Reader service no. 655**

The Ultimate Human Body

Dorling Kindersley Publishing, $79.95, 800/225-3362

If my biology classes had been anything like The Ultimate Human Body, I'd probably be a brain surgeon today. Or at least a dermatologist. Print publisher Dorling Kindersley, famous for highly visual breakaway-view books, has exploited multimedia for everything it's worth to produce one of the best CD-ROMs available. Almost every screen object—be it a point on the see-through body, or an inset of a particular body part—is a clickable hot spot that generates sounds, voice-overs, pop-up explanations, and visual surprises. Using some 100 animations, 1000 high-resolution illustrations, more than 700 screens, and pop-up windows within windows, The Ultimate Human Body illuminates our inner workings. Separated into subsections on the body machine, body organs, and body systems, this unparalleled disc makes education truly infectious. —*M.S.L.* **Reader service no. 658**

The Way Things Work

Dorling Kindersley Publishing, $99.95, 800/225-3362

David Macaulay's best-selling book, *The Way Things Work*, is the source for this CD-ROM, which vibrates with Macaulay's visionary energy: Virtually every object comes alive with sound and motion in response to a single mouse click. I had a continual, ear-to-ear smile as I was educated by the Woolly Mammoth, a cuddly character that guides kids of all ages along a time line of inventions, from the wheel to the elevator, the chariot to the supersonic jet. With 20 Mammoth Movies and more than 1500 screens to browse, this is the digital equivalent of a coffee table book you start browsing through and end up reading all night long. —*M.S.L.* **Reader service no. 659**

PRODUCTIVITY

Corel Professional Photos

Corel, $49.95, 800/772-6735

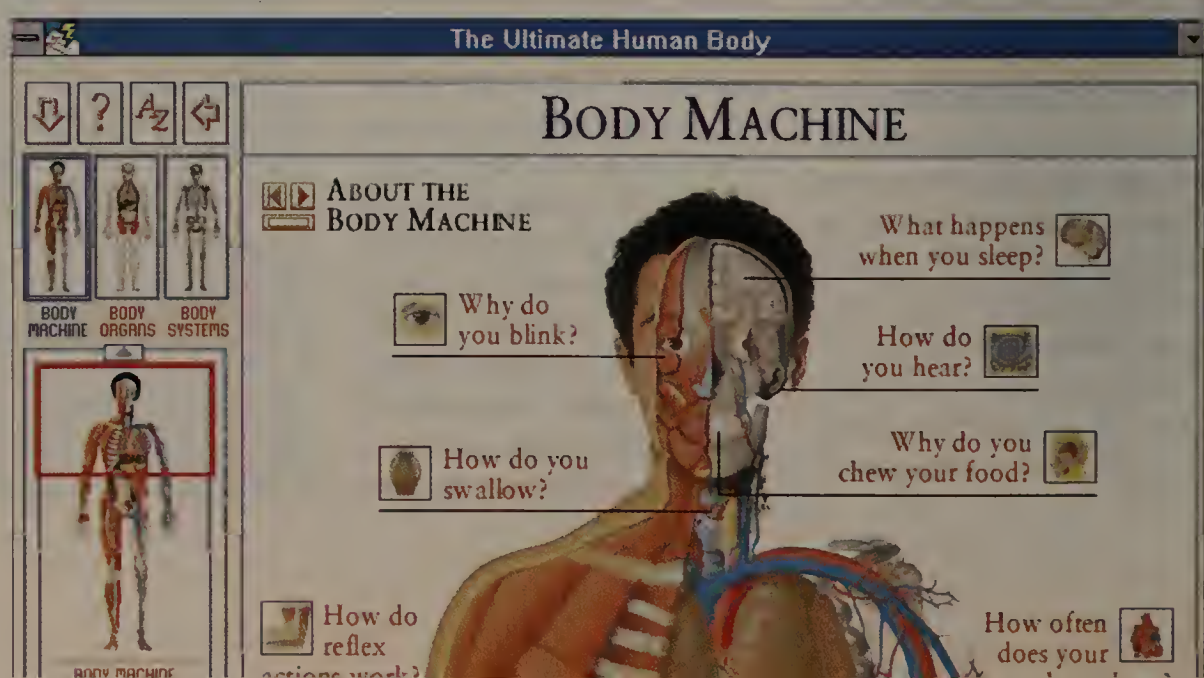
Clip art never looked so good, now that Corel has assembled a cornucopia of more than 200 CD-ROMs, each containing 100 Kodak PhotoCD-format stock photos, all royalty free. Each disc is specific to a given category, from the expected landscapes and oceanscapes to more offbeat images, such as exotic cars, food, and antique postcards. Corel also includes nifty utilities that allow you to customize photos and use shots as Windows screen savers and wallpaper. You can even play your audio CDs or included background WAV music files as you browse. If you register with Corel, you can periodically receive additional photo discs free of charge.—*M.S.L.* **Reader service no. 666**

Font Axcess 2.0 for Windows

Quantum Axcess, $19.95, 800/867-4890

If you've never met a font you didn't like, you're probably shoehorning every typeface you can find into your WINDOWS/SYSTEM directory. But fonts take up space and drain system resources. So before you delete your spreadsheet to make room for one more dingbat font, ask yourself, Is this really necessary? Font Axcess 2.0, a collection of 1001 TrueType fonts, will help cinch your decision. Its top-notch browser lets you view and print samples before you install a font, or you can print out a catalog of all the fonts on your system, with each font name in the appropriate typeface.

The fonts are standard shareware and freeware fare, with loads of display faces and a smattering of novelty items, from USPS bar codes to a smiley-face font. Maybe you'll have room on your hard disk to keep that spreadsheet on your system after all. —*S.F.* **Reader service no. 667**



THIS REPORTER KEPT GOING

DELL'S NOTEBOOK KEEPS GOING AND GOING...
Walter S. Mossberg, *Wall Street Journal, 9/8/94, Personal Technology Section*

"...any serious traveler who uses these portable PCs knows what he or she really wants; a battery that gets decent life, one that lets you use your computer continuously on a six-hour transcontinental flight. All the fancy features in the world aren't worth a damn when the battery dies out over Kansas City and your report won't be done till Philadelphia.

AND GOING

Well, listen up you beleaguered notebook nomads: I have found the Holy Grail. It's a full-featured, high-powered, name-brand notebook PC...

AND GOING

In fact, I'm writing these words on a Latitude XP that's been left on for about 10 hours and used now and again during that period to run various programs. The rest of the time, it's been idle, mainly in a low-power state imposed by its automated battery-saving program. It's got about half its charge left, according to the little battery gauge on the screen.

AND GOING ON

... the Dell Latitude XP, which still has 19% of its power left as I wrap up this column, 15 hours since the battery was charged."

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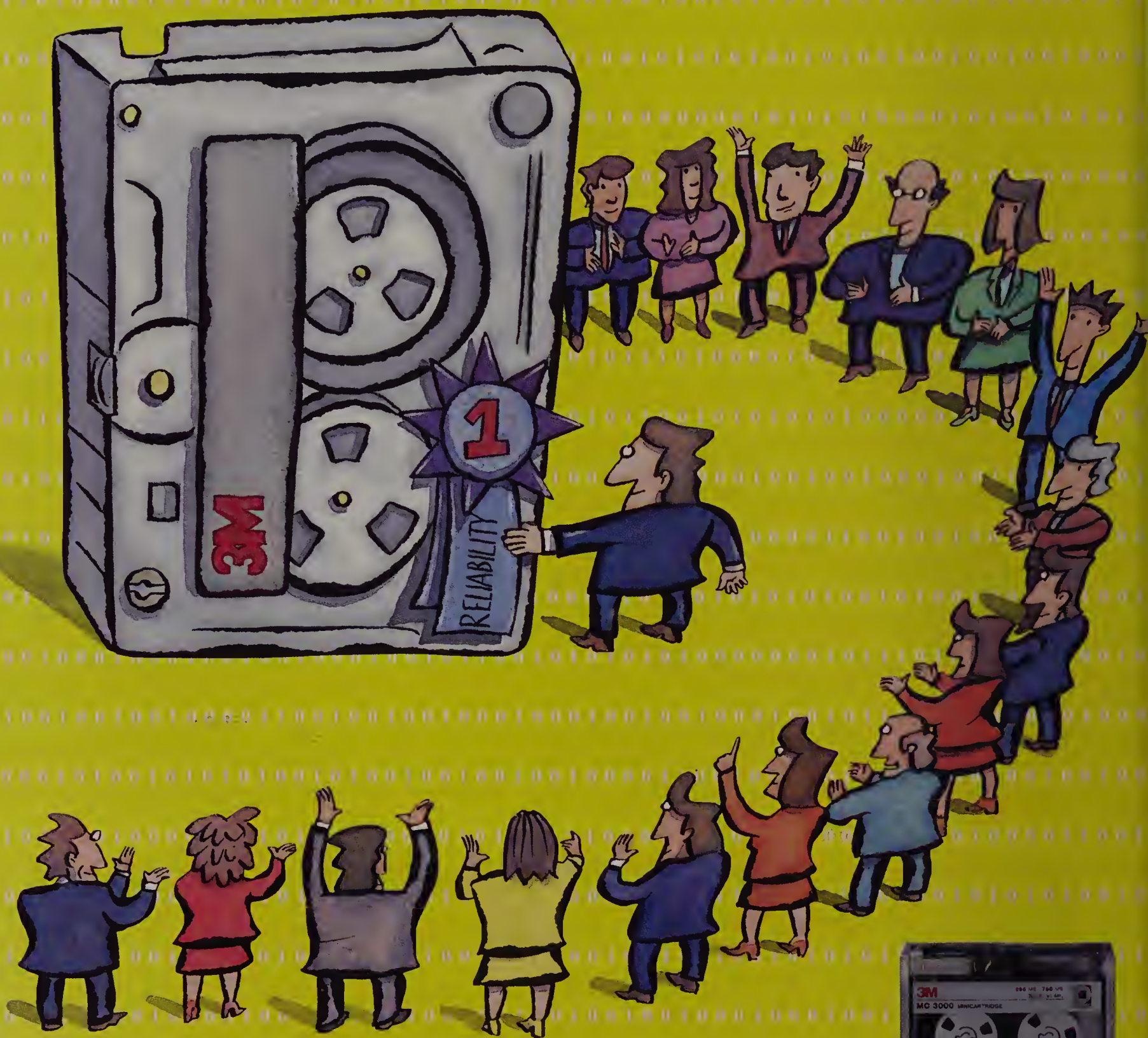

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TOP 10 ENTERTAINMENT, TAKE 2

By Fredric Paul
Editor, Electronic Entertainment

1. Rebel Assault
Great shoot-'em-up action in the familiar *Star Wars* universe. *LucasArts Entertainment*

2. Myst
This desert island adventure is a desert island pick. *Broderbund Software*

3. Millennium Auction
Enter a twenty-first-century auction where you can bid on Van Gogh oils and Bill Clinton's sax. *Eidolon*

4. Microsoft Complete Baseball
A colorful and complex look at the history of the game, with a high-tech twist. *Microsoft*

5. Microsoft Cinemania '95
More than you ever wanted to know about the cinema. *Microsoft*

6. New Grolier's Multimedia Encyclopedia
The best balance of encyclopedia basics and multimedia enhancements. *Grolier Electronic Publishing*

7. Woodstock: 25th Anniversary CD-ROM
Takes advantage of 25 years of electronic progress to jazz up the biggest rock festival of them all. Great music, well-chosen film clips, amusing *now* and *then* comparisons, and a clever interface make it a standout. *Time Warner Interactive*

8. Tony LaRussa, 1994 Season Edition
Statistical accuracy, great graphics, on-the-field baseball action. *Strategic Simulations*

9. J.F.K. Assassination: A Visual Investigation
Brilliant use of multimedia technology lets you conduct your own conspiracy investigation, with analytical animations of various theories. *Medio*

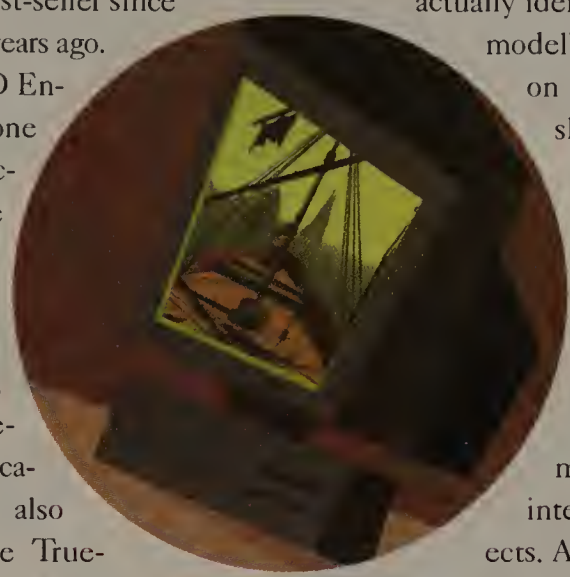
10. Ruff's Bone
The wildest, wackiest electronic book in the series that sets the standard for kid's titles. *Living Books*

Best CDs of '94

Print Shop Deluxe CD Ensemble

Broderbund Software, $80, 800/521-6263

Judging from the popularity of Broderbund's Print Shop Deluxe, most home PCs are used mainly to create welcome-home banners and birthday cards. Print Shop Deluxe has been a best-seller since it was introduced ten years ago. Print Shop Deluxe CD Ensemble adds stand-alone clip art and font collections, as well as the Print Shop Deluxe Companion, which offers a group of templates for certificates, business cards, envelopes, and other publications. CD Ensemble also gives you 73 scalable TrueType fonts, more than 1600 pieces of clip art, and roughly two jillion text effects. Despite this deluge of software, Print Shop Deluxe is as easy to use as ever. Experienced business users will find its tools limited compared to those of more serious DTP packages, but for a street price around $80, it's ideal for home and small-office users. —*Dan Miller* **Reader service no. 668**



REFERENCE

1994 Guinness Multimedia Disc of World Records

Grolier Electronic Publishing, $49.95, 800/285-4534

From the longest conga line to the rarest condiment, the 1994 multimedia edition of the Guinness Book of Records is serendipity all over the place. Explore the limits of the natural and not-so-natural world by word, topic, or superlative. The package also includes a small library of newsreels and videos, marking everything from Elvis getting drafted to the man with a "beard of bees." The Windows interface runs the program maximized on only three-quarters of the screen, but the stunning, high-quality images make the diminished screen size a small sacrifice. —*Susan Silvius* **Reader service no. 672**

Mayo Clinic Family Pharmacist

Ivi Publishing, $59.95, 800/432-1332

An indispensable and intelligently designed package, Family Pharmacist takes much of the guesswork out of using and identifying prescription and nonprescription drugs. My favorite part of the disc is the section that actually identifies the "make and model" of a pill as you click on its colors, size, and shape. When Pharmacist compiles the customizable personal profiles—where you can store the whole family's health care and medication records—it checks automatically for dangerous interactions and side effects. And while it can never replace a physician or a licensed pharmacist, the program does help you identify illnesses according to their precise symptoms: A first-aid section prompts you to specify the type of pain or the exact site of an injury. Click on the body part and detailed information pops up. You can also watch the program's many useful animated videos demonstrating first-aid treatments. —*M.S.L.* **Reader service no. 674**

McGraw-Hill Multimedia Encyclopedia of Science & Technology

McGraw-Hill Professional Book Group, $1300, 800/722-4726

Want to get technical in a hurry? You could sign up for some courses at the local university, but it might be easier to invest in the CD-ROM version of McGraw-Hill's 20-volume *Encyclopedia of Science & Technology*. While its $1300 price tag may make you feel as if you actually *did* enroll in college, the disc's rich content—

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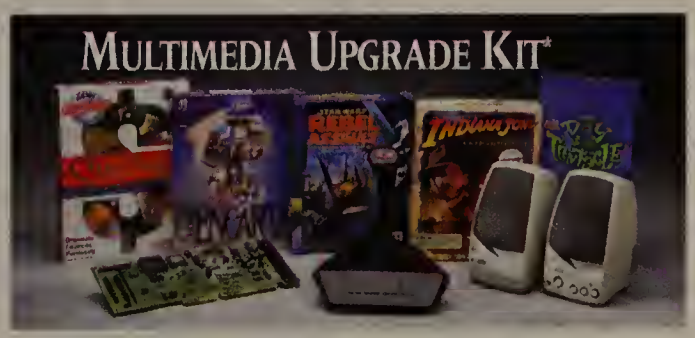

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informative descriptions augmented with animations, color maps and charts, photos, illustrations, and audio clips—is well worth the price. What's more, you can find what you're looking for with speed and ease, thanks to an uncluttered and refreshingly straightforward interface. The high price is McGraw-Hill's way of protecting the sales of its equally expensive print version, so clearly the disc will end up primarily in libraries and corporations.—*J.A.M.* **Reader service no. 675**

Microsoft Bookshelf '94

Microsoft, $69.95, 800/426-9400

With seven reference books crammed onto one CD-ROM, Bookshelf '94 puts you a mouse-click away from a huge collection of information—not to mention a heap of saved time. For history, science, and geography, you've got *The Concise Columbia Encyclopedia*, *The People's Chronology*, and the *Hammond Intermediate World Atlas*. For linguistics, you've got *The American Heritage Dictionary* and *The Original Roget's Thesaurus*. For trivia, there's *The World Almanac and Book of Facts 1994* and *The Columbia Dictionary of Quotations*. Even if you already own all these books, they won't pronounce 80,000 words for you, much less provide all the animation, video clips, and music scores Bookshelf does. There's also QuickShelf, a floating tool bar from which you can reference any word or phrase while working in another application. And you can copy and paste quotes, facts, and pictures to your word processor, spreadsheet or presentation program. —*Arden M. Hoffman* **Reader service no. 676**

Microsoft Encarta

Microsoft, $99, 800/426-9400

Compton's Interactive Encyclopedia

Compton's NewMedia, $79, 619/929-2500

Though these two top-notch multimedia encyclopedias look similar—with the obligatory photographs, video, sound, animation, and volumes of information—don't be fooled. Each has its own distinctive character and intended audience. For families with children, Compton's is the disc of choice. It provides hands-on guidance and encourages kids to investigate further. Its InfoPilot, for instance, suggests not only the topic requested but five related topics. Kids (as well as adults) can also use it to create

personalized multimedia presentations, combining their own narration with articles, videos, pictures, and sounds from the disk. **Reader service no. 657**

For in-depth information with a more adult bent, Encarta is the way to go. The text is detailed and sophisticated, while the videos, sounds, and pictures are sharp and illustrative. For example, searching for the biological term meiosis, I found not only the expected text describing cell mutation but a cool 30-second narrated video illustrating the process. A look under meiosis in Compton's got me zip. But I did find a video covering the Russian Revolution in Compton's, while Encarta had just a plain text description. —*A.M.H.* **Reader service no. 677**

PhoneDisk PowerFinder

Digital Directory Assistance, DOS and Windows versions, $249, 800/284-8353

With interstate directory assistance calls costing close to 75 cents a pop, digital phone books are the way to go for instant access to more than 91 million residential and business listings in the United States. PowerFinder offers full-reverse searching capability, which means you can find a listing by name, business type, street address, phone number, business type, and SIC code. Many residential listings pinpoint an address down to the exact apartment number. This five-disc set is also packed with utilities to let you print popular mailing label and envelope formats, as well as export addresses to digital PIMs, databases, and word processors. It even allows searches for partial or different spellings of names. It offers timely information with its quarterly updates.—*M.S.L.* **Reader service no. 678**

Power Japanese 2.0

BayWare, Inc., $389, 800/538-8867

If you've ever tried learning a language from a cassette-and-workbook course, your first session with Power Japanese should be a pleasant surprise—like the moment when *The Wizard of Oz* suddenly switches from black-and-white to Technicolor. This program takes language training into another dimension, and its thorough but fun design is unrivaled. The program augments basic grammar and pronunciation training (using digitized recordings of native speakers) with animated graphics, interactive drills, and exercises—and never needs rewinding. Spending 10 or 15 minutes a day with Power Japanese will give you a huge leg up on reading, understanding, and speaking, along with valuable insights into Japanese etiquette and social attitudes. And don't be alarmed by the steep list price—you can find Power Japanese in stores for as little as $150. —*Scott Spanbauer* **Reader service no. 679**

Random House Unabridged Dictionary, Second Edition

Random House Reference and Electronic Publishing, $79, with book $159, 800/733-3000

The 2552-page book weighs in at 13 pounds—the CD-ROM featherweight version, barely an ounce. To locate a definition in the book takes half a minute, plus the time it takes to haul the monster down from the bookshelf (and then heave it back up again!). Finding a word on the CD-ROM takes just a few seconds. Now, honestly, which one would you rather use? Looking up any of the 315,000-plus entries is a breeze: Even if you mangle the spelling of the word slightly, the search engine can still dig it up. There's convenient hot key access within any application, and a bonus anagram game provides a pleasant diversion. —*M.S.L.* **Reader service no. 680**

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ProCD, $299, four-issue subscription $399, 800/992-3766, 508/750-0055

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COMDEX/Fall'94

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its integrated Map Linx mapping capabilities, which let you pinpoint a listing's location on state and local maps. Updated quarterly, SelectPhone lets users export listings into other Windows mapping products to create useful customized databases. One downside: SelectPhone is a slow searcher when you have a person's address but not the name.—*M.S.L.* **Reader service no. 681**

TRAVEL

From Alice to Ocean

Claris Clear Choice, $69, 800/325-2747

Join a camel trek across Australia as explorer Robyn Davidson narrates her dramatic year-long journey from the middle of the Down Under continent to the western shore. Bundled with a visually stunning 200-page coffee table book, the disc contains many more of photographer Rick Smolan's images than appear in the book. As Davidson describes her adventures, you can meander around maps and interactive inset videos on culture, geography and nature, as well as video interviews with Smolan, who delivers a short lesson in how to capture that perfect shot. This is a benchmark example of what creative people can achieve with multimedia—in this case, bringing a two-dimensional book to fascinating life. —*M.S.L.* **Reader service no. 682**

Map'n'Go

DeLorme Mapping, $49, 800/452-5931

Forget AAA. Now you can plan your own car trips to anywhere in North America with Map'n'Go. Just enter a starting point and destination and the program calculates the distance and time to travel, based on your driving preferences.

You get an on-screen map—which you can print out, highlighting your route—as well as a text-based travel plan that details each leg of the journey (including the names of the highways, the compass direction, and the driving time on each road). You can just double-click the map route for pop-up menus listing various points of interest along the way, such as hotels, restaurants, and landmarks (many with photographs and narration). The program also includes a 128-page North American road atlas from Rand McNally. —*Caroline Jones* **Reader service no. 683**

Taxi

News Electronic Data, $79.95, 800/439-8294

On the road and looking for a good steak house near your hotel? Finally, a CD-ROM travel guide that offers detailed, opinionated, useful advice (based on the best-selling Zagat guides), that's easy to navigate, and that doesn't waste your time with glossy Chamber of Commerce–produced videos or vapid descriptions. With a few mouse clicks, you can choose a restaurant based on selected criteria (price, Zagat ratings, cuisine, and location), find the restaurant and your hotel on a color map, then get the distance and the best route between the two points. As its name implies, Taxi gets you where you want to go with a minimum of fuss. Just make sure that your road computer can play CD-ROMs—or else do all your research before you start on your journey. —*J.A.M.* **Reader service no. 684**

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For more information about all products in this article, circle reader service no. 910.

TOP 10 TRAVEL

By Aaron Sugarman
Special projects editor, Condé Nast Traveler

1. Taxi
Gobs of useful info for city visits in a no-need-to-read-the-instructions-first delivery. *News Electronic Data*

2. Berlitz Live Japanese
Those language specialists get you speaking, with sophisticated, animated lip-syncing techniques. *Bright Star Technology*

3. Frommer's Multimedia Travel Guides
This collection will set the standard for multimedia travel guidebooks for some time to come. *Paramount New Media*

4. Adventures
Delivers the world of adventure travel in all its exotic, muddy, sweaty glory. *Deep River Publishing/Cambrix Publishing*

5. OceanLife
Vivid underwater videos answer the diver's and snorkler's question: "What the hell is that?" *Sumeria*

6. Microsoft Art Gallery
An encyclopedic multimedia romp through London's National Gallery. *Microsoft*

7. TripMaker
Respected name in maps meets cleverly designed planning product for great road trips. *Rand McNally*

8. Street Atlas USA
Every street, road, and highway in America crammed onto one CD-ROM. It's not pretty, but it does the job. *DeLorme Mapping*

9. Great Restaurants, Wineries & Breweries
Delivers what it promises—thousands of listings, photos, menus, maps, and recipes—with witty icons and sounds. *Deep River Publishing/Cambrix Publishing*

10. Myst
Virtual travel. You don't just play this game—you live it. *Broderbund Software*

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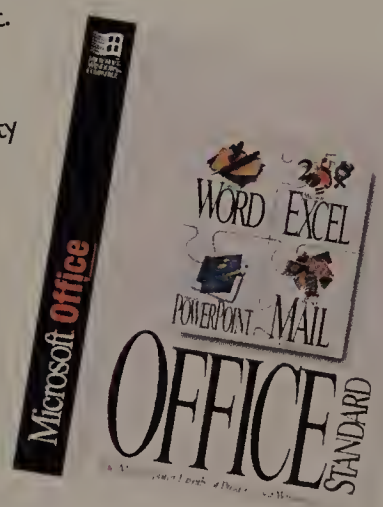

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Upgrade	Part# 87411 H	$349
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1-800-692-2106

Source Code MS24

* Upgrade price. MasterCard, Visa, Discover, and American Express accepted. Prices do not include applicable sales tax, handling and freight. Corporate Software, Inc., 2 Edgewater Drive, Norwood, MA 02062-4637. Offer ends December 31, 1994. Call for Canadian pricing. All product names referenced herein are trademarks of their respective companies.

Microsoft®

Circle 65 on reader service card

The New Compaq LTE Elite. All The Features You Asked For. From The Difficult-

At Compaq, we always try to give you the notebook features you've asked for. Even if your requests do seem to stretch the laws of physics. Case in point: the Compaq LTE Elite.

To begin with, we actually found a way to get rid of that bulky AC adapter that you've always had to carry. We built the LTE Elite to have its own **built-in AC adapter**, so when you travel, all you need is a thin power cord.

At your request, we also designed it to be easily expanded. The LTE Elite gives you a choice of fast 486 processors (up to 75MHz) and a **removable hard disk**. It also has **PCMCIA** slots that let you use over 140 Compaq-tested cards. And almost every key component is **upgradeable:** the memory, the display and the processor itself.

We even designed the LTE Elite to make things easier in the office – with the SmartStation and MiniStation **expansion bases.** Both of these options feature built-in networking* and SCSI-2 capabilities for an instant desktop configuration– with ports for your full-sized monitor and keyboard. The SmartStation also adds expansion slots and bays, a spare battery charger and motorized docking.

intel inside

Of course, the LTE Elite also provides the peace of mind that comes with the Compaq **three-year warranty**** and free **24-hour helpline.**

You can try the LTE Elite for yourself at a nearby authorized Compaq reseller. Or, if you would prefer receiving specifications immediately via fax, just give us a call at 1-800-345-1518, choose the PaqFax option and select document #4023.

With the LTE Elite, you'll find it's hard to make a wrong decision. If not impossible.

COMPAQ

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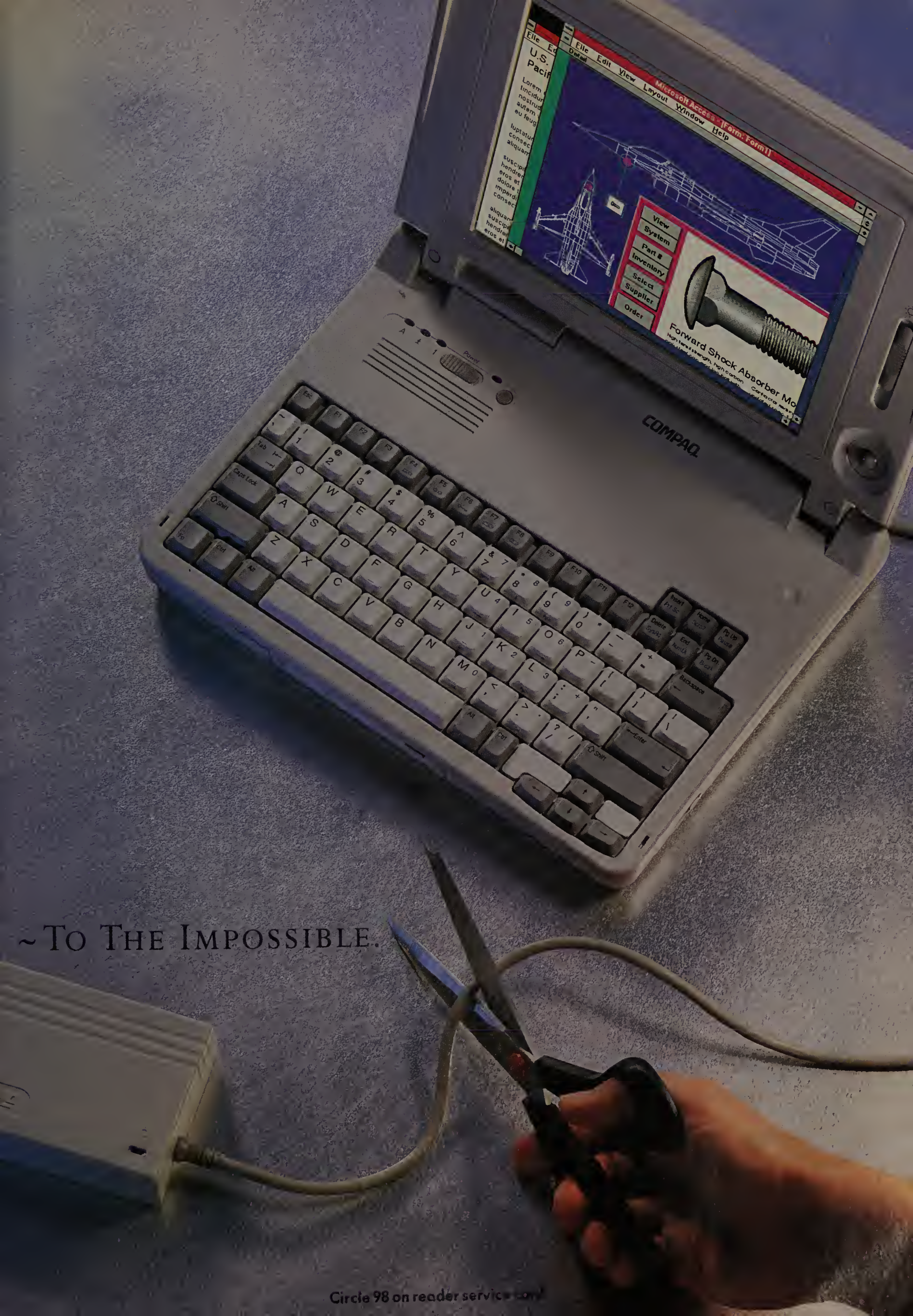

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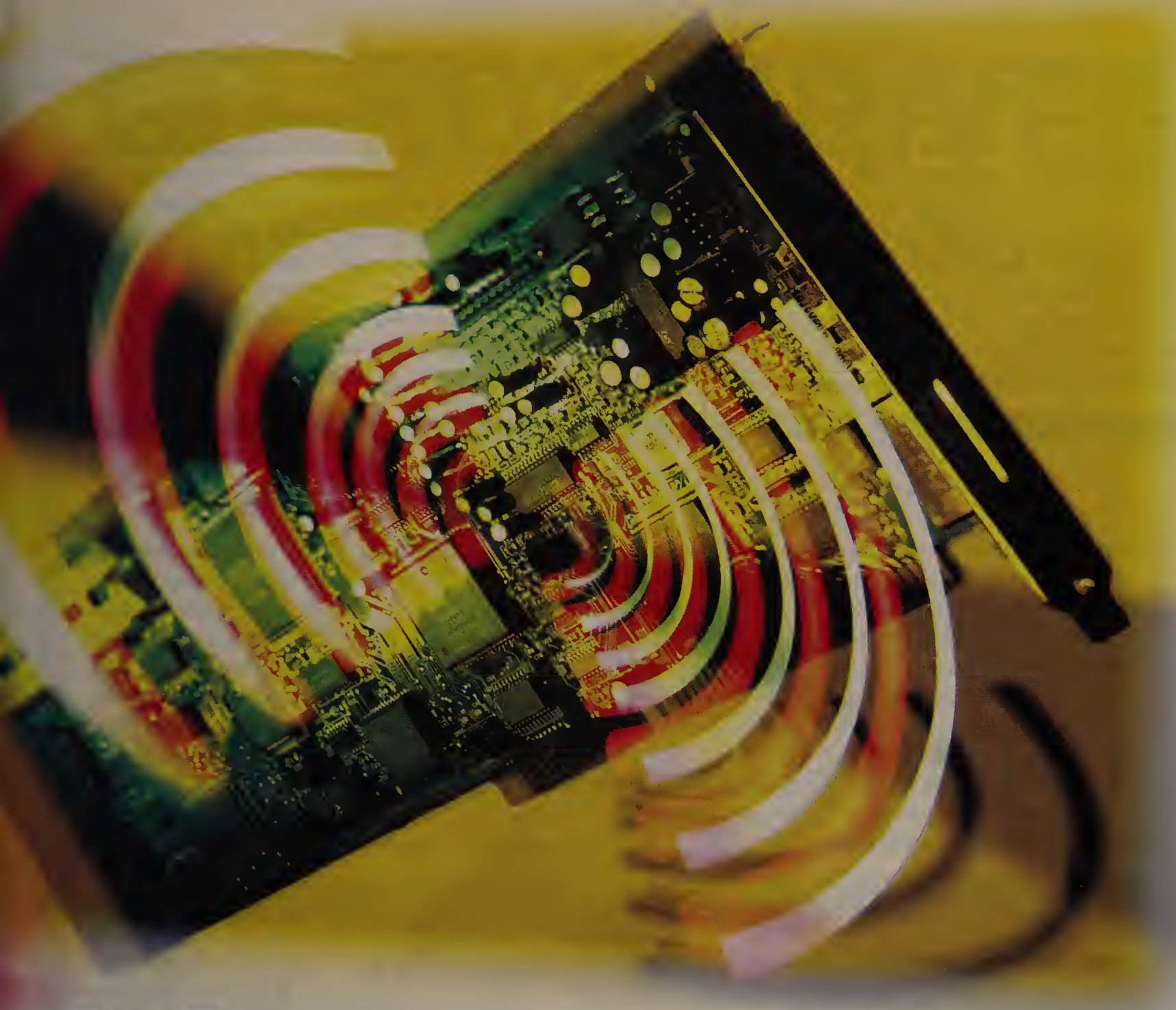

GEOFF SPEAR

and Sound Boards

BY MICHAEL DESMOND AND MELISSA RIOFRIO

Multimedia makes tantalizing promises of stunning graphics, full-motion video, and rich stereo sound, not to mention instant access to a seemingly endless fount of data. From children's games to spreadsheets, flight simulators to reference works, the latest software opens up a new world on the PC. But unless you have a CD-ROM drive and a sound board installed, the closest you'll come to multimedia is the occasional animation and an odd beep now and then from that built-in speaker. Fortunately, the cost of these components has dropped significantly over the past year, and improvements in performance and functionality make them valuable tools for almost anyone.

We review 14 CD-ROM drives and 13 sound boards to help you bring the latest applications to your desktop. We were impressed with how far these products have come in the last year. Most double-speed and faster CD-ROM drives meet the performance demands of the current software, and new interface standards make them easier to use. Sound boards, meanwhile, support high-fidelity audio and provide plenty of sound software; and several offer nifty tricks like speech recognition and text-to-speech capability. Our two CD-ROM drive Best Buys—one a double-speed, one a quad-speed—are for mainstream and high-end users, respectively. We chose our Best Buys in sound boards similarly: one for studio-level production; a versatile, mid-level offering for the

business user dressing to impress; and finally, a board that delivers great sound for games and entertainment at an economical price.

So what do you need to bring multimedia into your life? Theoretically, any CD-ROM drive should work with any sound board. In practice, managing the combined resource needs of these devices can make your installation experience resemble a shotgun wedding—and even the best marriages take work. CD-ROM drives and sound boards both demand attention from the CPU in the form of interrupts, direct memory access chips, and memory allocations. If their needs conflict, the whole relationship can fall apart fast.

Blame it on a lack of standards: Vendors have gone their separate ways on many issues, especially with sound boards, so that even little things, such as the type of audio cable to use, varies from one to the next. You should quiz vendors and dealers on compatibility between products, and plan on tweaking during installation.

An alternative is to look for a multimedia upgrade kit at your local computer store. These kits usually feature a brand-name sound card, a CD-ROM drive, a pair of speakers, bundled applications, and an installation routine to sidestep conflicts. While such packages can save time and money, you'll have to live with the components the kit vendor bundles. If you eschew kits and buy each item separately, don't forget that external speakers, while not reviewed here, are an important ingredient of your multimedia upgrade. The sidebar on multimedia kits, below, tells you who sells what.

Multimedia Kits: One-Stop Shopping

If you want to upgrade to multimedia, and fast, check out your local computer superstore or consumer electronics outlet, where you can often find multimedia kits with everything you need to make your plain old PC a multimedia powerhouse. With a CD-ROM drive, a sound board, a pair of speakers, and as many as 35 CD titles, these kits can deliver the goods for considerably less than if you bought them separately. We checked with several nationwide chains to see which kits are showing up on store shelves this holiday season, and found a limited selection from big-name multimedia vendors, such as Creative Labs and Reveal.

The same rules apply here as they do for buying a sound board or CD-ROM drive separately. Consider only double-speed or faster CD-ROM drives, and don't accept less than 16-bit sound from a bundled sound card. Although the chart below shows the number of software titles bundled with each kit, look for titles that you want, since the bundled software is often the biggest value in these products. Finally, many of the CD-ROM drive and sound card vendors we reviewed sell kits of their own, though they don't show up in chain stores. If you want a wider selection, or want a kit built around a specific board or drive, call the vendor directly to find out if they have anything available.

WHAT'S IN THE KITS

● Yes
○ No
n/a = not applicable

	Creative Labs Discovery CD 16	Creative Labs Edutainment CD 16	Creative Labs MMOffice EZ 16	Media Vision Super Deluxe Multimedia Kit	Media Vision Premium Deluxe Multimedia Kit	Reveal Explorer	Reveal Quantum	Aztech Labs Explorer
List price	$449	$599	$749	$499	$599	$299	$599	$499
CD-ROM drive								
Model	Creative Labs CR563	Creative Labs CR563	Creative Labs CR563	Sanyo H94MVA	Media Vision Reno	Panasonic 563B	Panasonic 563B	Explorer Personal CD-ROM
Speed factor	double	double	double	double	double	double	double	double
Interface	proprietary	proprietary	proprietary	proprietary	SCSI	IDE	IDE	proprietary
Internal/external	internal	internal	internal	internal	ext portable	internal	internal	external
Audio								
Sound Board Model	Sound Blaster 16	Sound Blaster 16	Sound Blaster 16	Pro Audio Spectrum	Premium 3D	SoundFX Studio EMC	SoundFX Wave32	Explorer Interface 16
MIDI type	FM	FM	FM	FM	FM	FM	wavetable	wavetable
Speakers	●	●	●	●	●	●	●	●
Headphones	○	○	●	○	●	●	●	○
Microphone	●	●	●	●	●	●	●	●
CD titles	15	42	14	15	15	6	35	10
Contact								
Telephone number	800/ 998-5227	800/ 998-5227	800/ 998-5227	800/ 845-5870	800/ 845-5870	800/ 326-2222	800/ 326-2222	800/ 886-8859
Reader service number	719	720	721	722	723	724	725	726

For more information about all products in this table, circle reader service no. 909.

CD-ROM DRIVES

The Power and the Glory

GEOFF SPEAR

Are you looking to buy a CD-ROM drive? Whether it's for business or pleasure, you've picked a good time: Speed, price, and technology barriers all are dropping fast. The double-speed CD-ROM drive is currently the de facto standard for running most multimedia applications, but quadruple-speed drives, while costlier, possess the speed to carry you into the next generation of CD-ROM–based software. Meanwhile, street prices for CD-ROM drives—as low as $140 for internal double-speed models—are simply irresistible.

Now that you're ready to spend your money, here are the caveats. Most CD-ROM drives look deceptively similar: boxy devices with a door on the front and a laser inside to read your CD-ROM disc. But in actuality, the interface type, speed, and available features can vary widely. The rapidly expanding market also means that you'll have to wade through a confusing proliferation of brand names. You can also buy CD-ROM drives as part of a multimedia kit—including a sound card and bundled software—but look before you leap into one of these packages (see "Multimedia Kits: One-Stop Shopping" on the preceding page).

Our review of 14 drives—some internal, some external—covers the double- and quad-speed offerings from the major players, with special attention to some contenders sporting the newest interface. You should consider buying an internal drive if you have an unoccupied, externally accessible drive bay. If portability is important, you may want to invest in an external drive, even though it will take up more space and costs more.

New double- and quadruple-speed CD-ROM drives promise fast video, smooth sound, and easy installation. Do they deliver?

BY MELISSA RIOFRIO

Because you will have to decide between double- and quad-speed drive compatibilities, we've chosen our favorite model of each: The Plextor 4Plex SCSI drive wins our quad-speed Best Buy, and the Aztech CDA 268-03I drive earns the laurels among our double-speed contenders. The Aztech placed fifth in overall performance—a misleadingly low ranking considering that three of the higher-rated drives were quad-speed models. Aimed at the mass market, the Aztech also proved very easy to install and turned in one of our lowest street prices at $145.

Expect to pay at least $400 for a quadruple-speed drive. But if top-notch performance, quality, and product longevity are your priorities, the extra cost might be worth it in the case of the Plextor 4Plex. Sharing top performance scores with the much pricier Pioneer DRM-604X, the Plextor (plus adapter) sells for about $529 on the street and offers many attractions: a comprehensive set of drive features; a friendly, organized, and articulate manual; an easy installation procedure; and good service and support policies.

Bear in mind that, with the market growing so fast, a number of products were not available in time for review. For example, NEC has introduced new lines of well-regarded double- and quad-speed drives (see *New Products*, November). And Panasonic, long a major player in the CD-ROM marketplace, offers two double-speed, tray-feed drives: The LK-MC509S is an external SCSI drive, and the LK-MC579BP is an internal IDE model. Due in stores by the time you read this, the Panasonic drives are expected to sell for $299 and $199, respectively.

We did not review single-speed drives because they are too slow for running today's multimedia applications. No triple-speed drives were available for review.

The Basics of Speed and Interface

Any of the drives reviewed here will ably run your typical multimedia applications. Nevertheless, they are not created equal: The issues of whether to buy a double- or quad-speed drive and which interface is right for you remain fundamental choices.

Most of the drives in our review are double-speed drives—named principally for their data transfer rate of 300 kilobytes per second (kbps), twice as fast as the original CD-ROM drives; they can handle both single and double speeds. Quad-speed models, as you might guess, feature a data transfer rate of about 600 kbps and can run at single or double speed if necessary.

The double-speed CD-ROM drive currently dominates the multimedia marketplace, and most CD-ROM applications are designed to run well at this speed. In 1995, however, as the prices for quad-speed drives continue to slip and as CD-ROM–based applications grow in complexity, expect to see the faster data transfer rate of quad-speeds emerge as the new standard. Spend the extra money for a quad-speed drive if you currently use data-intensive applications (especially animation and video, but also databases and text-retrieval software), or if you want your drive to age gracefully in coming years.

To further complicate matters, you have your choice of three interfaces for connecting a CD-ROM drive to your PC: SCSI, proprietary, or IDE. SCSI (Small Computer System Interface), pronounced "scuzzy," supports a wide variety of devices and allows up to seven of them to be connected to your computer using one adapter. Since a SCSI connection requires buying a host adapter for the first SCSI device you buy, this technology costs extra to implement up front.

A proprietary interface costs much less than SCSI but is, as the name implies, nonstandard; You can only use the drive sold with the interface; the proprietary adapter card takes up an expansion slot; and unlike SCSI, you cannot connect additional devices to it.

The ATAPI (AT Attachment Packet Interface) specification is part of the Enhanced IDE standard that's starting to appear on new PCs. ATAPI allows devices other than hard disks—namely, CD-ROM drives—to plug easily into an IDE cable, a cheaper interface to implement than SCSI. Unless your PC is fairly new and has Enhanced IDE and ATAPI built into its system BIOS, however, you will still need to buy an adapter card for an IDE-based CD-ROM drive.

All three interfaces have pros and cons. SCSI is technologically the richest and most versatile; consequently, it in many ways surpasses the needs of the typical desktop PC user. Proprietary interfaces offer a lower-priced alternative to SCSI, but you sacrifice compatibility and functionality. The advent of the IDE CD-ROM drive—with both a low price and a compatibility standard behind it—probably signals the impending death of the proprietary interface. Choose SCSI if you think you will need its connectivity and multitasking capabilities. If not, IDE or proprietary should suffice.

Video Playback Sets Performance Pace

THE PACESETTERS

• Plextor 4Plex • Pioneer DRM-604X • Toshiba XM-3501 • Sony CDU-55S

The PC World Test Center measured the drives' proficiency in gathering and delivering data using a number of multimedia applications. We ran a CAD-based animation clip from Autodesk's Animation Pro. We loaded an image from a Kodak Photo CD. We searched for all mentions of a word in Microsoft Bookshelf '94. The hardest test involved playing a Microsoft Video for Windows AVI clip mastered for each of two frame rates—15 and 30 frames per second (fps). A 15fps rate is the standard for video playback on CD-ROM drives, while the higher 30fps rate yields a more refined image. (By comparison, television is broadcast at 22fps).

All the products we reviewed performed within acceptable levels except in the video clip test. Delivering audio and visual playback harmoniously taxes data-throughput capabilities. If it can't deliver the information fast enough, a drive will drop frames or cause breaks in the audio playback, making for jerky motions and choppy sound delivery. All the drives completed the 15fps clip without dropping a significant number of frames, but the slower

BEST BUYS

DOUBLE-SPEED: Aztech CDA 268-031

QUAD-SPEED: Plextor 4Plex

Both the Aztech and the Plextor turned in top-notch performance scores compared to their peers. Only one other double-speed drive—the Sony CDU-55S—was faster than the Aztech, but that product also cost about twice as much. The Plextor won a hotly contested race against the two other quad-speeds—the Pioneer DRM-604X and the Toshiba XM3501E1. We'd consider any of these drives to be top choices performance-wise; the Plextor, however, prevailed with the lowest price.

Choose the double-speed if you plan to run games, popular reference works, and other entertainment/edutainment applications, which are designed to run well at this mainstream performance level. However, business and professional uses—those that work with large databases, animation or video, anything that demands everything the drive's got—beg for the quad-speed's greater capabilities.

Fast, inexpensive, and easy to use, the Aztech double-speed and Plextor quad-speed drives earned Best Buy ratings.

PHOTOGRAPH: GEOFF SPEAR; ILLUSTRATION: GORDON STUGER

Multimedia Goes Mobile: Portable CD-ROM Drives

An external CD-ROM drive has to connect into your computer somehow. But what happens if your desktop PC doesn't have an empty expansion slot for the adapter card? Or you need to move the CD-ROM drive easily from PC to PC? Or you have a mobile computer with no place to plug in an adapter card?

You could attach the CD-ROM drive to the parallel port, a universal feature of PCs, but there's a catch: The standard parallel port's poky data transfer rate makes for frustratingly slow performance. Some new PCs are configured with an Enhanced Parallel Port (EPP), which supports transfer rates that are five to ten times faster than the standard parallel port. You can add an EPP to an older desktop PC by buying an expansion board that supports it.

Parallel Connections in the Slow Lane

Disctec's Roadrunner Express CD-2x and MicroSolutions' Backpack Parallel Port CD-ROM are external drives that connect to the parallel port. Both vendors advertise that their parallel port drives operate at double-speed rates when connected to an EPP. When we tried to configure the drives to operate at double-speed, however, each—especially the Roadrunner—had problems.

The Roadrunner was incompatible with our test system, an Ares DX4-100 using an Award BIOS. When we finally got the drive installed, we ran our suite of multimedia and animation tests and observed painfully slow results from the Roadrunner. It also failed to recognize the EPP on the Dell Latitude XP notebook we used, causing the system to hang when it tried to load the driver. We ironed out the problem after talking to Disctec technical support, but we never managed to achieve anything greater than single-speed performance.

The Backpack unit didn't demonstrate compatibility problems with either computer, but, alas, it performed no better than the Roadrunner on our tests.

If you already own an external CD-ROM drive, you can turn it into a portable by investing in a parallel-to-SCSI cable conversion kit, such as the APA348 Parallel-to-SCSI Host Adapter for uni- and bidirectional parallel ports, or the APA358 Parallel-to-SCSI Host Adapter for EPPs. (Both are available from Adaptec for $189 and $239, respectively.) All double- and quad-speed drives, however, can be used with unidirectional and bidirectional parallel ports, and many also conform to the EPP specification. If you can't tolerate performance compromises on the road, and your notebook has an empty PCMCIA Type II slot, you can buy a PCMCIA SCSI controller card and a SCSI CD-ROM drive. It's an expensive way to go portable, but the performance gain should ease the sting of the extra cost. —Susan Silvius

- *Adaptec, 800/959-7274*
Reader service no. 856
- *Disctec Corp., 800/553-0337*
Reader service no. 857
- *MicroSolutions, 800/890-7227*
Reader service no. 858

drives tended to drop more frames from the 30fps clip.

The Plextor 4Plex, Pioneer DRM-604X, and Toshiba XM3501E1 quad-speeds, plus the double-speed Sony CDU-55S, completed our tests in the least time and with the fewest dropped frames in the video test. The Pioneer and Plextor drives turned in the fastest scores for the CAD-based animation test. The Sony, the Aztech CDA 268-03I, and the Mitsumi FX001DE drives performed similarly in the image-load test, while the Sony and the Toshiba XM-3501 and XM-3401 surpassed all others in the database search. The Teac SuperQuad 4X—the only quad-speed drive with a proprietary adapter—gave a disappointing performance more closely comparable to the other double-speed drives than its ostensible peers, the Pioneer, Plextor, and Toshiba models. These results are probably due in part to the Teac's relatively small 64K buffer—the Plextor, for instance, tops out with a 1MB buffer, and most drives have at least 128K. (For more on buffers, see below.)

In the bigger picture, our benchmarks reveal that the double-speed CD-ROM drives ably handled all but the most demanding of our applications—the 30fps video clip. Quadruple-speed drives did not perform twice as fast as double-speed models, but this expectation may be premature: Because CD-ROM applications currently are optimized to run on the more common double-speed drives, quad-speeds may not have a chance to shine until more demanding applications arise.

The Buffer: Good News, Bad News

An important factor affecting drive performance is the drive's buffer—a virtual space, much like the RAM in your PC, where information can be stored temporarily until the drive is ready to send it to the CPU. The good news is that having a buffer of any size is an advantage, and the bigger the better: The buffers in the drives featured here range in size from 32K to 1MB.

There are three kinds of buffers, each defined by how it handles blocks of data coming from the CD-ROM drive. A static or "dumb" buffer simply accepts and holds data until the CPU calls for it. A read/look-ahead buffer tries to have data ready ahead of time—a boon for large, sequential files such as video and audio clips. A dynamic cache buffer, on the other hand, is optimized to work with small, randomly accessed files, as in a database. This kind of buffer keeps data it thinks might be read again.

But here comes the bad news: Taking advantage of different types of buffers is difficult because manufacturers usually tell you

only the size, not the type, of the buffers included in their drives. So don't worry about what type of buffer you have; just make sure the buffer is at least 64K on double-speed drives and 256K on quad-speeds to handle the demand these drives generally will encounter.

ATAPI, Proprietary Win on Price

THE PRICE LEADERS

- **Double-speeds: Mitsumi FX001D and FX001DE, and Aztech CDA 268-03I**
- **Quad-speeds: Plextor 4Plex, Teac SuperQuad 4X**

Most drives reviewed here perform acceptably, so price is the main consideration. There are two rules of thumb for CD-ROM drive prices: ATAPI (IDE) and proprietary models are cheaper than SCSI; and the faster the drive, the more expensive it is. The ATAPI drives start at only $140 for the Mitsumi FX001DE, with the Aztech CDA 268-03I ($145), Mitsumi FX001D ($150), and Philips CM207 ($200) close behind. The rest of the drives reviewed range anywhere from $300 to $1100, with our Plextor quad-speed Best Buy nestled comfortably in the middle at $529 (with adapter). The highest-priced drive, the $1100 Pioneer DRM-604X (a two-year-old model that was the first quad speed on the scene), offers a six-disk changer for easy access to multiple applications.

Prices for CD-ROM drives are based on two rules of thumb: IDE and proprietary models are cheaper than those with SCSI; and the faster the drive, the more expensive it is.

Ease of Installation and Use

THE EASIEST TO USE

- **Philips CM207; • Sony CDU-55S**

Installing a CD-ROM drive should involve three basic steps regardless of the interface type: adding an adapter card to a slot on your motherboard or connecting the drive to a SCSI, ATAPI, or proprietary connection; installing the drive in an open drive bay and attaching power and interface cables; and installing the driver software. Installation software and manuals should help you over the inevitable rough spots; most of these drives provide decent versions of each, but few were utterly problem-free.

Keep in mind that every model of PC is unique, with each component having the potential to affect others. While your CD-ROM drive installation will most likely go smoothly, don't be surprised if a glitch or two arises. Happily, most problems can be easily solved with a call to tech support.

The installation software makes changes to your PC's CONFIG.SYS and AUTOEXEC.BAT files, as well as to other system settings. The ideal installation would do everything for you automatically. However, most of the drives reviewed here came with installation programs that stepped through the process by asking you a series of questions. Most of the time a program simply asks your permission to do something it already has determined to be the correct measure—so while this exchange is tedious, at least you can accept the defaults it offers with few qualms.

None of the drives' installation programs were unacceptably difficult, but some occasionally skimped on explanations. For example, the Aztech tells you to press <Ctrl>-<Alt>-<Del> but doesn't mention that this key combination reboots the computer—for which forewarning would be nice. The Toshiba and Teac drives had problems with outdated drivers that were easily remedied.

The Philips CM207 distinguished itself by having a fully automated installation program and clearly written, logically structured documentation. The Sony CDU-55S used the Adaptec EZ-SCSI installation kit, which was indeed easy and offered a clutch of miniapps to use with your drive.

Most drive documentation was fine, with some exceptions: The Chinon CDX-535 had one manual for the host adapter card and another for the drive, without indicating which to consult first. The manuals for the Hitachi CDR-1900S were minimal and sketchy on installation procedures, and one for the Hitachi CDR-1950S was written in several languages in a disorganized manner—chapter by chapter instead of language by language—making for a lot of extra page-flipping. The Mitsumi FX001DE's manual focused on the operation of the drive but said nothing of the software installation or interface.

The Little Things

THE RICHEST FEATURE SETS

- **Chinon CDX-535 • Hitachi CDR-1900S and CDR-1950S • Plextor 4Plex**

Some features are common to all CD-ROM drives: All have an in-use light, an ejector for regular and emergency situations, a dust-protection door, standard headphone jacks, and volume control; all support multisession Photo CD.

Not all the drives include a software ejection method or RCA output jacks, however; and while special dust-protection doors help, the drive's ability to ward off intrusive dirt and moisture has much to do with how the disc is inserted. With tray-feed models you simply place a disc on a retractable platter, which carries it into the drive. But this open method leads to greater intrusion of dust and moisture into the drive. Using a protective caddy involves the extra step of loading the disk into a jewel box and inserting it into the drive, but much less contamination occurs this way. In addition, a caddy-feed drive can run on its side.

You'll find the most comprehensive feature sets on the Chinon, Hitachi, and Plextor drives. The inexpensive, no-frills Aztech and Mitsumi models take the minimalist approach to their sets.

Service and Support

THE BEST SERVICE PACKAGES

- **Hitachi CDR-1900S and 1950S • Philips CM-207 • Plextor 4Plex**
- **Teac SuperQuad 4X**

Most likely, the only time you'll need technical support with a CD-ROM drive is when you install it or try to make it work with another device. While you shouldn't expect the level of service offered for entire systems, some basic support can make the difference between frustration and satisfaction. Hitachi, Philips, Plextor, and Teac offer the best overall service packages.

GEOFF SPEAR

FEATURES COMPARISON

From $140 Double-Speeds to $1100 Quad-Speeds

● Yes
○ No
n/a = not applicable

	DOUBLE-SPEED DRIVES										QUADRUPLE-SPEED DRIVES			
	Aztech CDA 268-031	Chinon CDX-535	Hitachi CDR-1900S	Hitachi CDR-1950S	Mitsumi FX001D	Mitsumi FX001DE	Philips CM207	Sony CDU-55S	Toshiba XM-3401	Toshiba XM-4100A	Pioneer DRM-604X	Plextor 4Plex	Teac SuperQuad 4X	Toshiba XM-3501
Drive														
Street price [1]	$145	$329	$737	$752	$150	$140	$200	$260 [2]	$415 [2]	$455	$1100	$479	$425	$600 [2]
Interface type	E-IDE [3]	SCSI	proprietary	SCSI	proprietary	E-IDE [3]	E-IDE [3]	SCSI	SCSI	SCSI	SCSI	SCSI	proprietary	SCSI
Internal or external	internal	external	external	external	internal	internal	internal	internal	external	external	external	internal	internal	external
Adapter														
Street price [1]	included	included	included	included	included	n/a [4]	included	$129 [2]	$155	$155	$200 [5]	$50	included	$155
Make and model	OEM IDE connector	Nolan NCS-250-SC	Hitachi CDR-IF16-A	Future Domain TMC-850MER	Mitsumi 74-1881A	n/a	Philips LMS CM270	Sony AVAINT	Future Domain TMC-850	Future Domain TMC-850	Future Domain TMC-1650	Future Domain TMC-1610 kit	Teac ISA	Future Domain TMC-1610M
Drive performance specifications														
Average access time (ms)	350	220	260	235	250	250	280	220	320	200	300	235	195	150
Sequential transfer rate (kbps)	300	300	300	300	300	300	307	360	300	330	600	600	600	600
Mean time between failures (hours)	30,000	50,000	40,000	40,000	50,000	50,000	30,000	60,000	50,000	50,000	50,000	70,000	50,000	100,000
Drive features														
Power indicator	○	●	●	●	○	○	●	●	●	●	●	●	●	●
Software eject	●	●	●	●	○	○	●	●	○	○	●	●	●	○
Uses disk caddy	○	●	●	●	○	○	○	○	●	●	○ [6]	●	○	●
Automatic lens-cleaning mechanism	○	●	●	●	●	○	○	●	●	●	○	●	○	●
Standard phono audio output (RCA) jacks	○	●	●	●	●	○	●	○	●	○	●	○	○	●
Width x depth x height (inches)	5.9 x 8 x 1.9	6 x 9.9 x 2.1	7.1 x 13.5 x 2	7 x 13.5 x 1.8	5.8 x 7.9 x 1.6	5.8 x 7.9 x 1.6	5.8 x 8.2 x 1.6	5.8 x 8 x 1.6	5.5 x 8.3 x 1.3	8.7 x 9.8 x 2.7	8.3 x 14.6 x 4.1	5.8 x 8.4 x 1.8	5.8 x 8 x 1	5.8 x 8 x 1.6
Built-in buffer (K)	256	320	128	256	32	128	256	256	64	256	128	1024	64	256
Can run on side	○	●	●	●	○	○	○	○	○	●	○	●	○	●
Micro Channel bus interface available	○	○	●	●	○	○	○	●	○	○	○	●	○	○
Audio software	○	●	●	●	●	●	○	●	○	○	○	●	●	○
Service and support														
Warranty (years)	1	1	2	2	1	1	2	1	1	1	1	2	1.25	1
Technical support	●	●	●	●	○	○	●	●	●	●	●	●	●	●
Toll-free phone support	●	●	●	●	n/a	n/a	●	○	○	○	●	●	●	○
Daily support (hours)	9	8.5	8	8	n/a	n/a	24	8	10	10	10.5	9	24	10
Weekend support	●	○	○	○	n/a	n/a	●	○	○	○	○	○ [7]	●	○
Free unlimited support	●	●	●	●	n/a	n/a	●	●	●	●	●	●	●	●
Turnaround policy (days)	30	3	5	5	n/a	n/a	30	10	○	○	5	5	5	○
Contact														
Phone number	800/886-8859	800/441-0222	800/369-0422	800/369-0422	800/648-7864	800/648-7864	719/593-4081	800/352-7669	714/583-3111	714/583-3111	800/444-6784	408/980-1838	800/888-4923	714/583-3111
Reader service number	691	692	693	694	695	696	697	698	700	699	701	702	703	704

Best Buys in red

[1] Vendor estimate.
[2] List price.
[3] Enhanced IDE.
[4] Not available from Mitsumi.
[5] 16-bit card. 8-bit card $100.
[6] Six-disc magazine.
[7] Available for special accounts only.

For more information about all products in this table, circle reader service no. 905.

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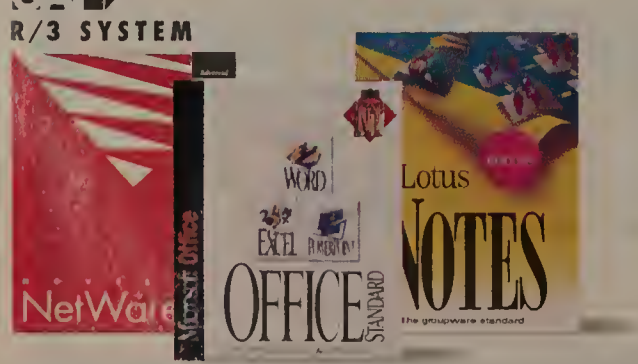

Windows NT Server works with any client, including Windows™ for Workgroups, MS-DOS® or Windows NT Workstation operating systems. And with this release, our highest-rated product for customer satisfaction just got better.

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Introducing the new Microsoft family of server applications.

Now more than ever, efficient information sharing and management is crucial to serving customers and staying competitive. The new Microsoft family of server applications—for

*Please specify Windows NT Workstation or Windows NT Server evaluation kit. **Based on BAPCO-Sysmark94 results—48 clients total time.

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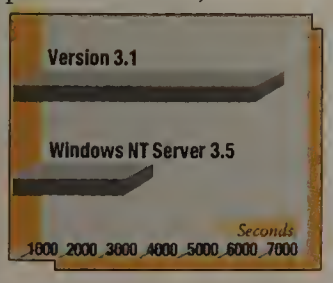
latabase management, messaging, host ıccess and system management—can ;eamlessly integrate corporate infor- nation with the desktop to radically mprove business performance, whether you're ın emerging :ompany or al- eady one of the Fortune 500. And the open Windows NT Server platform inte- grates solutions from other major endors in the industry as well, giv- ng you maximum choice.



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The new 3.5 release of Windows NT Workstation has a substantially smaller memory requirement and runs applications up to three times faster—with full integration (via OLE objects) and crash protection for both 16- and 32-bit applications. It continues to be the best choice for a secure desktop, ensuring all important files and programs are protected from tampering and user error.

Full power now and into the next century.

Microsoft Windows NT and the Microsoft family of server applications are built to optimize your current investment while positioning you well for the future. The Win32® application programming interface and OLE object technology are Microsoft's strategic system technologies. Applications that run today will continue to run in the future, protecting your investments while providing a flexible client-server architecture that lets you quickly adapt to a changing business environment.

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—Len Monteleone, V.P. of I.T.

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All drives offer at least a 12-month warranty. Teac offers 15 months; Hitachi, Philips, and Plextor, 24 months. Mitsumi is the only manufacturer providing no technical support; the other companies can be reached at least during normal business hours, and Teac and Philips stand out with 24-hour support, including weekends. Turnaround times for repairs vary anywhere from 3 days to 30.

CD-ROM Drives Hit the Big Time

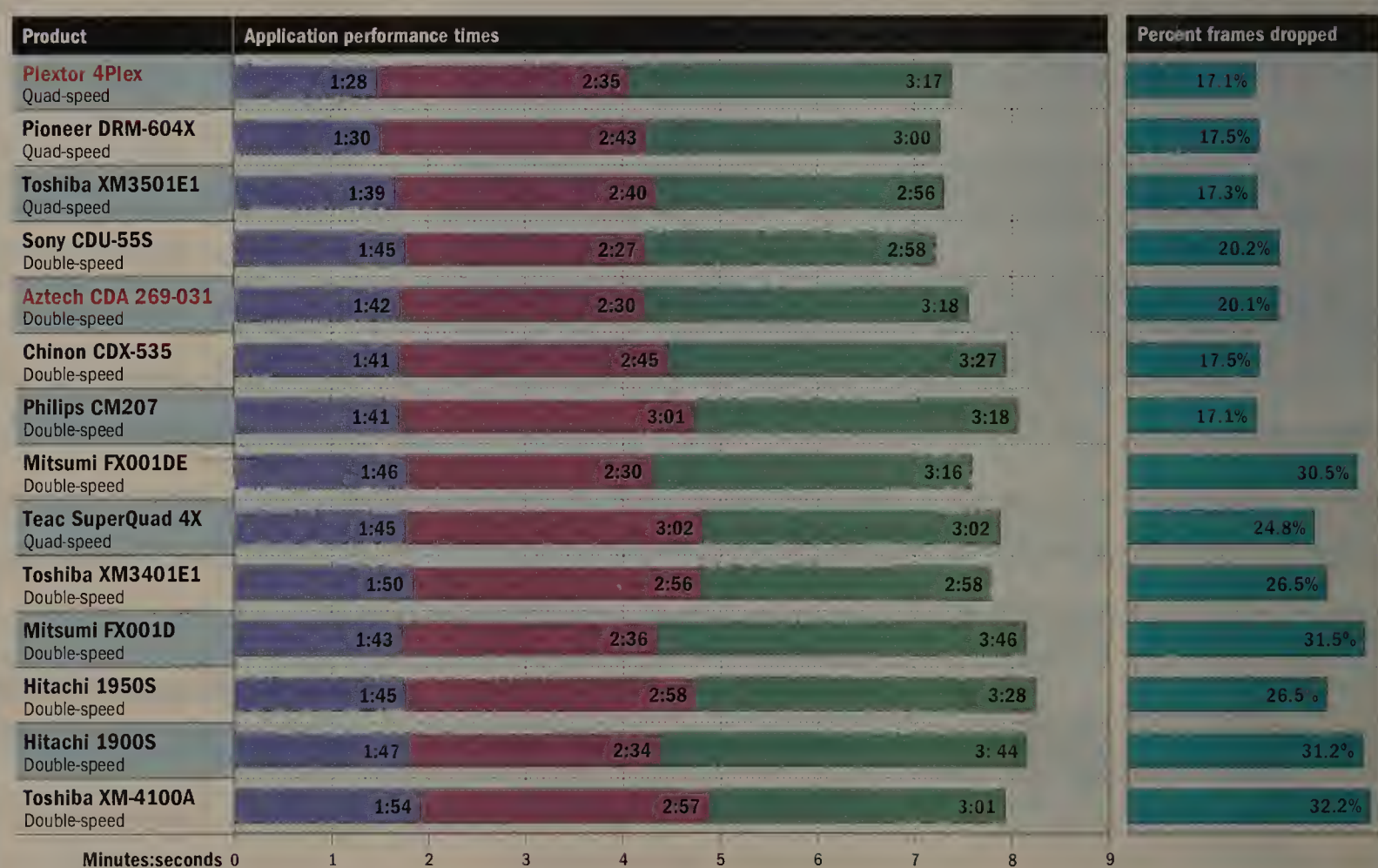
Technology marches inexorably forward, and the CD-ROM drives that not so long ago were pie-in-the-sky dreams for entertainment, information, and audiovisual business presentations are now becoming standard fare on higher-end PCs. You can jump in now by buying an efficient double-speed drive, or get a head start with a more expensive quad-speed model that will see you further into the future of evolving multimedia technology.

Our Best Buys prove that value exists at both ends of the spectrum. With ATAPI and proprietary drives taking up the low end with serviceable econoboxes, and with SCSI maintaining its hold on the high end with premium products, there are plenty of choices that will accommodate your wallet and your PC—as well as your demands for multimedia.

Melissa Riofrio is an assistant editor for PC World. *She can be reached on PC World Online (see page 12 for contact information). Susan Silvius, who is a senior analyst at the PC World Test Center, also contributed to this article.*

TEST REPORT

Quad-Speeds Lead in Performance



Best Buys in red

Drives are arranged in order of overall performance from best to worst, based on the normalized, equally-weighted scores from four tests. A drive may have a better overall performance rating than another that took less time or dropped fewer frames.

Methodology

We tested all drives using a DX4/100 PC with 8MB of RAM, a 256K secondary cache, a VLB graphics accelerator with 2MB of VRAM, a 425MB IDE hard drive, a 16-bit sound board, DOS 6.22, and Windows 3.11. We used the interface adapter, cabling, and software provided by the vendor and the vendor's installation program with default values.

Autodesk Animator Pro 1.3A
We executed a batch file that plays a series of FLI files totaling 16MB. We measured the total playback time.

Kodak Photo CD
We installed the Photo CD viewer, then recorded the time to load and display a 5.5MB image file.

Microsoft Bookshelf '94
We executed a word search through the database by defining two text characters and one wild-card character using the Find function. We recorded the search time from start to a list of found matches.

Microsoft Video for Windows 1.1
Using the Vidtest 1.1 utility in Video for Windows, we played two AVI video clips mastered with a window size of 320 by 240 pixels, a color depth of 16 bits per pixel, a transfer rate of 300 kbps, and using Intel's Indeo 3.1 software compression scheme. The first clip was mastered for 15 frames per second and the second for 30 frames per second.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

BEST CD-ROM DRIVES AND SOUND BOARDS CONTINUES ON PAGE 173.

This is a business graphics software program.

Do not be afraid.

REPEAT

Do not be afraid.

Business drawing for people whose business isn't drawing.

DRAG & DROP DRAWING FOR EVERY DESKTOP
VISIO
FOR BUSINESS GRAPHICS
3.0

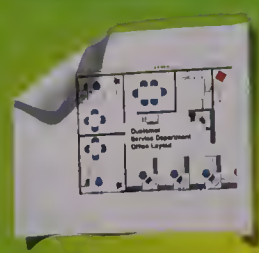
Salvation arrives in the form of a little blue box.

● So you're no Rembrandt. And the words "business graphics software program" make your hair stand on end. Well friend, fear no more. Visio® software is here. ◆ It's super advanced Windows™ software that will have you effortlessly drawing all kinds of things the first time you draw. There's nothing like Visio for the Windows desktop. The things that will make your business documents sing. Organizational charts. Total Quality Management diagrams. ■ Project timelines. Engineering schematics. Whatever your heart desires. (And get this, YOU don't actually have to draw anything at all.) With 22 stencils and over 750 SmartShapes. ▲ Visio has everything you need already drawn for you. Get Visio and you'll be doing things you never dreamed of doing. ▲ Like drawing a flowchart and putting it into a memo. The big word here folks is ENABLING. No other business ■ graphics program lets you do so much, so quickly with such little effort. Because no other program is designed to work so seemlessly and effortlessly within Windows. It takes drawing out of the hands of the art and CAD departments and puts it right into ◆ yours. Someone will say, "Hey, I didn't know you could draw." And you'll lean back in your chair with your hands behind your head and modestly say, "I can't." ● No wonder it's the all-in-one drawing package corporations are standardizing on.

"Visio should be used as a standard computer program on all Motorola® Windows-based PC computers as a productivity tool... the user can transform almost any thought or idea to screen, paper or slide at least 30% faster than this could have been done using any of the other tools we tested."

[said Motorola MOTsan.]

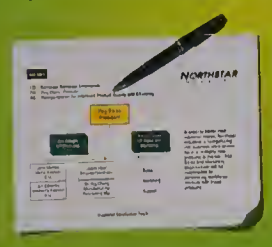
(What It Is.)



With Visio's Space Plan stencil, you can easily draw an accurately scaled version of your office floor plan in minutes.

Use Visio's Total Quality Management stencil to draw a company process flowchart or reengineer the whole kit and kaboodle.

What spreadsheets ▲ do for numbers and word processors do for words. Visio does for shapes. With Visio's one-of-a-kind Drag, Drop, Done technique, you'll be communicating visually in no time. ■ Just drag and drop pre-drawn SmartShapes™ from stencil to page. Add text. SmartConnectors.™ Formatting. And you're done. ▲ In technical terms. Drag. Drop. Done. ● You'll be drawing organizational charts. Flowcharts. Timelines. Block diagrams. Network diagrams. Office layouts. Quality management ◆ process flows. Marketing diagrams. ■ Technical schematics. Anything and everything you can possibly think of. All easily rendered by you right in the comfort of your ◆ very own Windows applications. With a state-of-the-art implementation of OLE 2.0 technology, Visio allows you to simply and painlessly add incredible graphics into your everyday business documents. Like your fax machine. ● once you use it, you'll wonder how you ever got by without it. Your boss will be thrilled. Your clients will be impressed. Your ninth grade art teacher will try to take all the credit. ▲

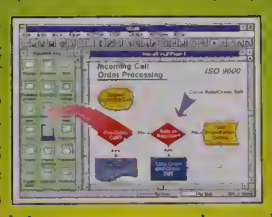


You can effortlessly document your company's organizational chart of command in no time at all with Visio.

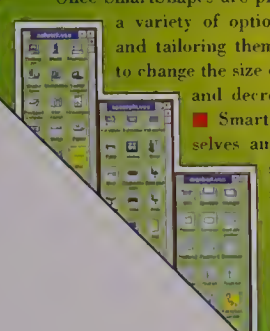
Use the network stencil to visually document your company's network. Then drop it into your presentations and memos.

(What It Does.)

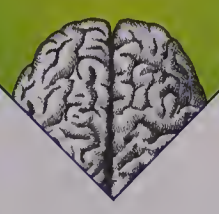
So you can't draw. No problem. Visio is cake. Just drag the pre-drawn SmartShapes from stencil to drawing page, then, drop them in. In technical terms, Drag. Drop. Done.



● Visio is cutting edge, one of a kind, easy to use stuff. To create a drawing, simply drag and drop a SmartShape from stencil to page. ▲ It's smart and intuitive. So you don't have to go through additional, painful steps to get what you want. Your visuals will practically draw themselves. Once SmartShapes are placed on the page, you have a variety of options for arranging, changing and tailoring them instantly. When you want to change the size of a SmartShape it increases and decreases in size proportionally. ■ SmartConnectors reposition themselves automatically when you move shapes around, finding the shortest, most appropriate link between two shapes. So even if you move a shape to another area of your screen, it stays ◆ connected. And Visio ▲ is easily customized. You can create your own shapes or buy additional ones. Save the ones you create on a stencil, distribute them to others and you have a standard drawing platform for the entire company. ◆ Visio's advanced implementation of OLE 2.0 allows your Visio drawings to be seamlessly integrated into your other documents, presentations and spreadsheets. Which means virtually every department ▲ in your company can use them in the applications they work in everyday. In other words, using Visio is cake. Visio's switchable user interface lets them choose ● between both Microsoft Office® and Lotus SmartSuite® menus and toolbars. Which cuts the learning curve down to almost zero. Pretty neat stuff, huh? ■



Visio is good for your brain. It's packed with over 750 SmartShapes and 22 stencils. Which means you can draw flowcharts. You can draw timelines. You can draw maps. You can draw almost anything without straining the old noodle.



(How It Works.)

▲ Order Visio for just $129. ● It comes with a 60-day money-back guarantee. ■ Call or enclose order form in an envelope and mail to: Shapeware Customer Service, P.O. Box 22063, Denver, CO 80222-9505. Please do not send cash or purchase orders. Make checks payable to Shapeware Corp. ◆ U.S. funds only.

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(How To Get It.)

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Visio 3.0 system requirements: MS Windows 3.1 or higher. 386, 486, Pentium-based computer or higher running at 25 MHz or faster. 4 MB RAM or more. VGA, Super VGA, XGA, or 85141A graphics card. MS Mouse or compatible printing device. Optional: Win 3.1 compatible printer. Math coprocessor. LAN (volume licenses available).

SOUND BOARDS

The Sound and the Fury

Watch a big-screen movie like *Dances With Wolves* or *Lawrence of Arabia* on a 9-inch black-and-white TV, and you'll get an idea of what it's like to run multimedia software without sound. Whether it's the thunderous blast of a 12-gauge shotgun in Doom or the haunting music in Myst, sound is ultimately the element that transports you from your desk into a different world.

Sound can enhance more than just games—all sorts of applications and tasks gain a new dimension. Popular multimedia titles, such as Microsoft's Encarta and Compton's Interactive Encyclopedia, become more compelling when you hear the rumble of an Apollo rocket launch or the mesmerizing cadences of Dr. Martin Luther King Jr.'s "I Have a Dream" speech. Children become much more involved, too—watch them light up as cartoon characters come to life with snappy dialogue and engaging sound effects in games or in such titles as GrandMa and Me or Arthur's Teacher Trouble. In the boardroom, captivating music scores and special effects can transform dry presentations, impressing cynics, wowing clients, and rousing a sleepy audience. And if you've purchased a PC in the last year, chances are there's already a CD-ROM drive spinning away silently inside, just waiting for a voice.

The latest models feature better audio quality, voice and MIDI capabilities, and lower-than-ever prices. But are they easy enough to use?

BY MICHAEL DESMOND

The latest sound boards can meet all these needs and more, and at prices that can fall below $130 on the street. But not all boards are created equal, and a board that's fine for hacking your way through the halls of Doom may not be appropriate for producing that big presentation.

So how do you know which board to buy? Take a look at your needs. If you want a sound board to play back audio from CD-ROM titles and DOS-based games, look first for compatibility with Creative Labs' ubiquitous Sound Blaster board, since almost all game software supports it. Good sound quality, easy installation, and plenty of technical support can't hurt. Those using a sound board for business—for recording voice snippets and sprucing up informal presentations—will want useful audio applications, good overall sound quality, and a microphone. Finally, if you do large presentations or professional-level audio production you'll require top-notch audio fidelity and powerful software—Sound Blaster compatibility or no.

To help you choose, we reviewed 13 sound boards that represent a sampling of the wide range of choices on the market. While there are sound boards available at every price level—from $50 knock-offs to professional quality studios-on-a-board that can run $5000 or more—the products in this roundup all fall below $300 on the street and can handle 16-bit, 44.1-kHz audio. This is identical to the digital sound on audio CDs and is the minimum you should consider buying, since new CD-ROM titles take full advantage of this capability.

The 44.1-kHz rate refers to the number of times each second—in this case, 44,100 times—that the sound board takes a snapshot of incoming or outgoing sound. While sampling at 11 or 22 kHz is okay for recording and playing speech and sound effects, they don't create an accurate enough picture of the sound for music and other rich audio. The "16 bits" designation refers to how much data is stored in each sample, with higher numbers again creating more realistic sound. For complex

audio, such as music, you'll want to use 16-bit sound, but 8-bit resolution is fine for speech and simple noises. The lower rates will introduce some background noise into your recordings but will save a ton of disk space.

The Sound of MIDI

Also consider MIDI capability, which is present on all but two of the boards we reviewed. Short for musical instrument digital interface, MIDI is a music-industry standard for creating and storing electronic representations of musical scores. Unlike Windows' WAV files, which store complete pictures of audio waveforms—and consume more than 5MB of disk space per minute—MIDI files consist of instructions that tell the sound board which notes to play and on what instruments. With its small file sizes and distortion-free playback, MIDI is especially useful in presentations, and is frequently used to provide music in games and titles.

But there are two types of MIDI playback, FM synthesis and wavetable. FM synthesis might suffice for game players and those unconcerned about realistic music production, but most users will want wavetable MIDI. The reason? FM synthesis fakes instrument sounds by modulating two or four signals—resulting in inaccurate reproduction—while wavetable uses actual samples of instruments playing to reproduce realistic scores. Although wavetable MIDI requires on-board memory to store samples of oboes and baby grand pianos, the sound quality is worlds away from tinny FM synthesis. But even wavetable MIDI quality can vary, depending on the quality of the sampled MIDI sounds and the complexity of the system used to generate notes. Fortunately, regardless of which MIDI type your board supports, all MIDI files are universally supported—you just may not like what you hear. Finally, make sure a board supports at least 24 simultaneous instruments, particularly for presentations and for demanding orchestral sound.

Still, you probably won't mistake your PC for a quality stereo system, in part because electrical signals inside a PC's case introduce background noise that degrades quality. More important, most boards simply aren't designed for maximum fidelity. Only one board we tested—the Turtle Beach Systems MultiSound Monterey—could match the fidelity of professional audio equipment.

Make the Connection

Remember that a sound board is only as good as the speakers it's wired to. Most PCs sport small, unamplified speakers, and often sit in noisy environments, making subtle differences in fidelity tough to discern. If you want superior audio, invest in amplified speakers that connect to the board's line-out jack. While a speaker-out jack lets you use inexpensive speakers, the low-cost amplifier found on the board will introduce noise and distortion.

Beyond audio, many boards include connections for a CD-ROM drive—with a single board often available in different versions, for various CD-ROM interfaces—which can help save an ISA slot, since both the drive and board use one card. And don't overlook compatibility—DOS-based games and multimedia titles can cause headaches ranging from minor problems, such as inconsistent sound quality, to wholesale system crashes. The reason is there's no official standard for integrating sound boards and DOS software, so both rely on the de facto standard found in Creative Labs' popular Sound Blaster board. But a glance at Creative Labs' forum on CompuServe shows that even owning a Sound Blaster is no cure. It may help to use a diagnostic package, such as E-Ware's WinSleuth Gold, to snoop out interrupt request (IRQ) lines, direct memory access (DMA) channels, and other system resources to avoid conflicts, but your best bet is a good support package. Look for money-back guarantees, long warranties, and toll-free tech support.

BEST BUYS

STUDIO: Turtle Beach MultiSound Monterey

BUSINESS AUDIO: Creative Labs Sound Blaster AWE32

ENTERTAINMENT: Creative Labs Sound Blaster AWE32 and Wearnes Beethoven ADSP-16

The only easy winner here is the $345 Turtle Beach MultiSound Monterey—it's the best for those who need professional audio quality. Not only is its audio fidelity head and shoulders above the rest, its powerful sound software will cause hardcore studio rats to rejoice.

For the flexibility necessary for business-related audio, turn to the $298 Creative Labs Sound Blaster AWE32, which stands out with decent sound quality and excellent software that includes 3D sound and text-to-speech and speech recognition capabilities. Its lavish documentation is another welcome feature.

Finally, gamers must struggle with shaky Sound Blaster compatibility—heck, even Creative Labs' own AWE32 gave us problems—and a host of game- and system-related conflicts. But the AWE32 and the Wearnes Technology Beethoven ADSP-16 gave us the smoothest rides and the best sound in the games we tested. So our advice is: If you have a game that you want to buy a board for, get online and ask other gamers about their experiences.

Clockwise from upper left: Turtle Beach MultiSound Monterey, Creative Labs Sound Blaster AWE32, and Wearnes Beethoven ADSP-16.

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Sound Boards

If it's neat special effects and speech capabilities you're after, look for a sound board with a digital signal processor chip. Features like voice recognition, text-to-speech utilities, and 3-D sound need the extra horsepower of a DSP chip, although some boards use a DSP to handle MIDI tasks. The DSP is also often used to help compress space-hungry audio files, making DSP-equipped boards good for business users recording speech. And if you want more than your sound board's got, consider Microsoft's Windows Sound System, which offers basic audio tools, sound clips, and voice recognition and text-to-speech functions to compatible boards.

We tested all boards on an AST Advantage 486DX2-66 PC outfitted with a CD-ROM drive and a fax-modem card (which helped us test compatibility with multiple devices). We used the sound software supplied with the boards to create, edit, and play back WAV and MIDI files. We also played with the boards, running Id Software's Doom, a popular shareware game, and Actionvision's F-14 Tomcat, a flight simulator. Finally, we ran the boards through a battery of fidelity tests to measure audio quality. We used a pair of unamplified Labtec speakers, an amplified Sony CSS-B100 speaker system, and a pair of Infinity floor speakers running off a stereo amplifier to compare output. Keep in mind that these boards can—and *will*—behave differently on different machines and with different software. In other words, your mileage may vary.

Installation: Jumping the First Hurdle

EASIEST TO INSTALL

- **Creative Labs Sound Blaster AWE32**
- **Orchid Technology SoundWave 32+ SCSI**
- **Turtle Beach Systems MultiSound Monterey**

Installing a new sound board can be like putting a young child to bed: You can't tell if it will behave right away or keep you up all night throwing digital tantrums. Fortunately, sound boards are beginning to grow up. While most of the products we tested offer polite installation routines, the $170 Advanced Gravis UltraSound Max, the $244 Aztech Labs Sound Galaxy Orion 16, the $260 Creative Labs Sound Blaster AWE32, and the $279 Media Vision Pro 3D all feature diagnostic software to snoop out system settings, prompting you with data on available resources. But even this feature can't guarantee a smooth install—several boards balked when we tried to get them running.

Both the Media Vision Pro 3D and the $199 Logitech SoundMan Wave, for example, gave us problems. The Pro 3D failed to install completely because its diagnostic software—usually a *good* feature—locked our system. And since there's no way to avoid the diagnostic step in the installation routine, the Pro 3D effectively trapped itself in a fatal cycle—though we were able to install the board on another system without incident. **continued on page 182**

Sound Advice: Tips for Painless Audio

1 Know your system: Before you install a board, know which IRQs, DMAs, and address ports are free. Many boards prefer IRQ 5 or 7, but you'll also need a second IRQ for Sound Blaster compatibility. Find out which ones are open by using programs such as E-Ware's WinSleuth Gold or Landmark Research International's WinProbe.

2 Put it all together: If possible, buy a sound board and CD-ROM drive together as part of a kit. That way the sound board can double as the CD-ROM adapter—saving you an ISA slot—and you're assured of having a compatible CD-ROM audio line to hook the drive to the sound board. Better yet, a kit will set up the installation so that the CD-ROM drive and sound board don't step on each other's toes.

3 Location, location, location: Install the card away from the power supply and hard disk, which create electrical fields that distort sound quality. If you hear a high-pitched whine in your audio, check the board's placement. Make sure your system is plugged into a properly grounded outlet.

4 Look before you leap: Once the board is installed, don't go leaping into Windows. First check that the product's DOS applets—often a command line WAV and MIDI playback utility—can play MIDI and 8-bit and 16-bit WAV files. If they work, you know that the board and system are talking to each other. If they don't, then you have a basic problem such as a conflicting IRQ or other resource—as opposed to a problem with Windows or a DOS-based game.

5 Watch those WAV files: The dirty little secret of sound boards is that WAV files can chew up acres of disk space. To save room, reserve 16-bit, 44.1-kHz recording for when you absolutely need it—such as when creating an audio track for a big presentation. Voice files and sound effects should work fine with 8-bit, 22-kHz settings.

6 Don't panic: If something goes wrong, remain calm. Often a game or title will not work with a sound board because the game itself is looking for a Sound Blaster card in the wrong place. Check the program's setup routine and change the IRQ, DMA, and port addresses to match the SET BLASTER statement in your AUTOEXEC.BAT file.

7 Log on: Major online services such as CompuServe, America Online, and Prodigy, with their lively, informative forums on various computer-related topics, can prove invaluable when you are dealing with a finicky board. For game problems, check the appropriate game and hardware forums, and you may be surprised to find that someone has already blazed that trail ahead of you. Often, downloadable driver updates can resolve problems, particularly with newer boards.

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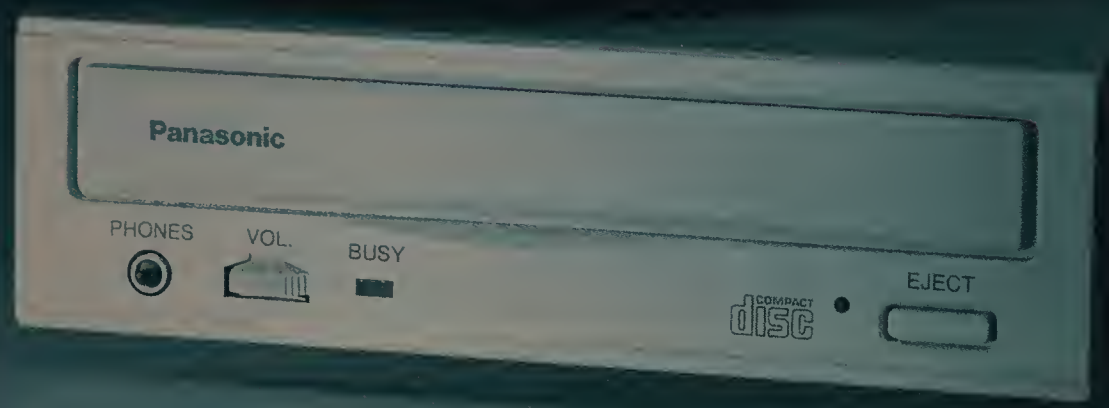

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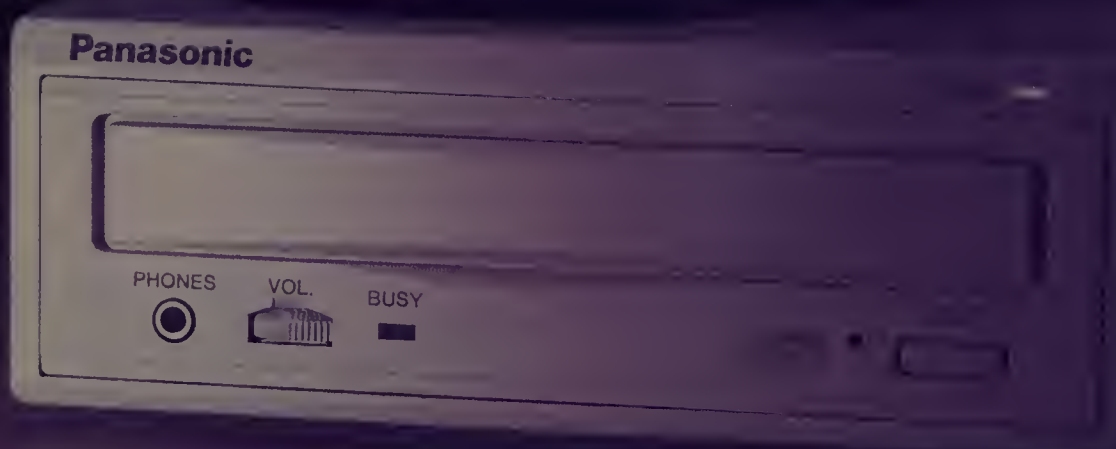

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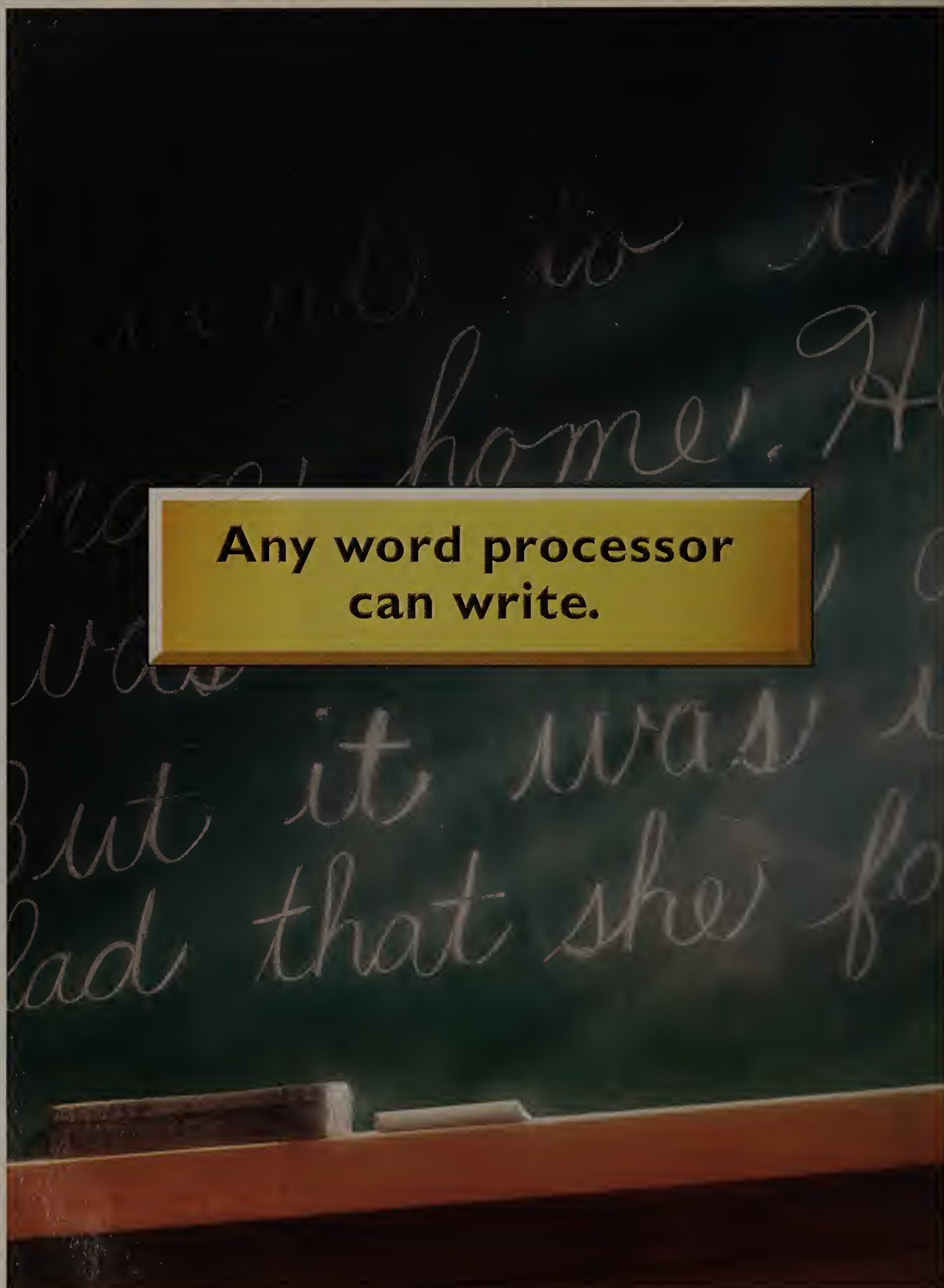

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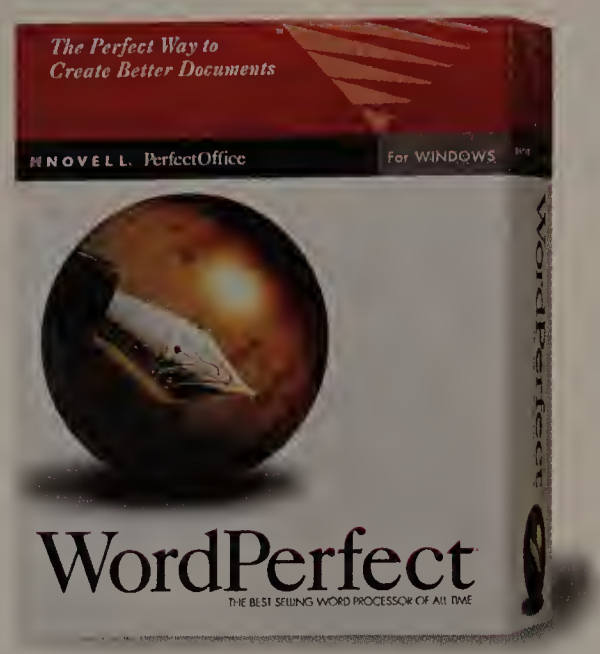

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The SoundMan Wave, meanwhile, clashed with the system's video driver—an ATI Mach 32 graphics adapter—but a call to tech support resolved the problem.

Otherwise, most boards installed quickly and smoothly, letting us play our first sound clip within 15 minutes of opening the box. All the routines ask the user to name the directory for audio applications and driver files, and note changes to AUTOEXEC.BAT and CONFIG.SYS files that usually amount to a couple of lines. Almost all the boards offered to set up a CD-ROM drive as well. Changes to Windows were similarly polite. Full installations ranged from 8 diskettes (Advanced Gravis UltraSound Max) to 2 diskettes (Turtle Beach MultiSound Monterey and others), with an average of about 7MB of disk space needed to store utilities and applications. All the boards can accept several IRQ and DMA settings.

Creative Labs' Sound Blaster AWE32 gets the nod for best installation based on its exhaustive documentation, excellent diagnostic tools, and accessible test utilities. The one drawback is the card's length—some systems don't offer room for full-length cards, or only accept them next to the hard disk or power supply, where interference can cause audio problems. Other full-length cards include the Advanced Gravis UltraSound Max, the $190 Ensoniq SoundScape, and the $199 Reveal SoundFX 32 Wave. The $199 Orchid Technology SoundWave 32+ SCSI and the $289 Turtle Beach MultiSound Monterey, meanwhile, garner mention for their smooth Windows installations, quick setups, and compact size.

But there's more to installation than dodging a few bullets. If you already have a fax-modem, CD-ROM drive, and perhaps a hand scanner in your PC, chances are you'll need to do some finagling to get everything to work. One problem is that almost all boards provide Sound Blaster compatibility to work with popular game software, requiring them to set up a virtual second board that soaks up resources. This gives the Sound Blaster AWE32 an advantage, since it doesn't need to emulate itself, while the MultiSound Monterey skirts the issue by not providing emulation at all. The worst offender? Media Vision's Pro 3D, which promptly grabbed three IRQ lines—count 'em!—to provide Sound Blaster compatibility, MIDI capability, and its own functions (other sound boards took two of the six lines found in most PCs). One note: If you're on a network, all bets are off—seek professional MIS help to avoid clashes with Ethernet cards and the like.

Compatibility: Dealing with DOS

MOST COMPATIBLE

- **Creative Labs Sound Blaster AWE32**
- **Wearnes Technology Beethoven ADSP-16**
- **Western Digital Paradise 16-DSP**

Now the hard part—getting the boards to run. Despite pressing deadlines on our presentation, our first priority was to play some games. And we were pleasantly surprised to find that all the boards let us climb into that cockpit or stalk those demon-filled halls without delay—though all too often, it was in dead silence.

Once more, the AWE32 stands out, though not without a major caveat. The board caught the subtle difference in engine noise when we pushed the F-14's throttle from 60 percent to 80 percent, and was all too accurate in producing the scary music and demonic snarls in Doom. But the various drivers consumed so much conventional memory that it was difficult to get the games to run. The $129 Wearnes Beethoven ADSP-16 and $140 Western Digital Paradise 16-DSP produced accurate music and effects in both games while forcing a minimum of gymnastics. The $299 Toptek Technologies Golden Sound Pro 16 Plus gave a near-perfect performance after a shaky installation.

The rest had problems of all sorts. The Advanced Gravis UltraSound Max and the Aztech Labs Orion 16 would not produce sound in Doom at all, but played F-14 Tomcat almost perfectly. Others could handle music in Doom, but not deliver digital sound effects—the $149 Genoa AudioBlitz Stereo 16+ and the Media Vision Pro 3D suffered from this malady. The worst case was the Ensoniq SoundScape, which did poorly in both Doom and F-14 Tomcat, while its near-twin, the Reveal SoundFX Wave 32, got Doom just right but was a major disappointment in F-14 Tomcat. The Turtle Beach MultiSound Monterey, which offers no Sound Blaster compatibility, abstained in this contest.

General Audio: Of Sound and Software

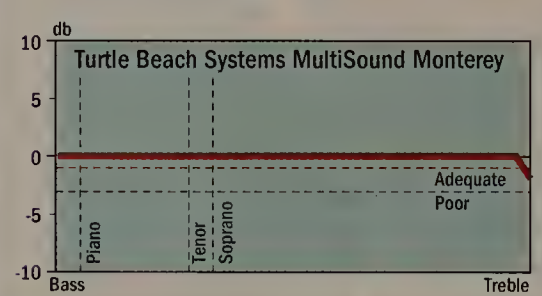
BEST OVERALL FEATURES AND PERFORMANCE

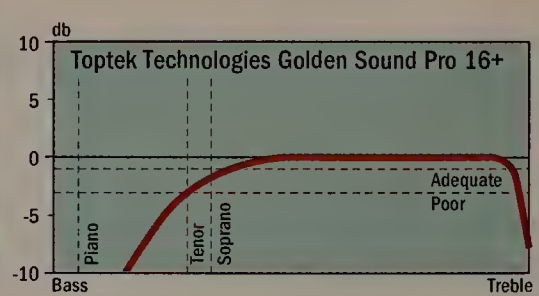
- **Turtle Beach MultiSound Monterey**
- **Creative Labs Sound Blaster AWE32**

The real test is how well these boards record, edit, and play back WAV and MIDI files. Here, our top picks reflect the quality of both sound and software. The Creative Labs Sound Blaster AWE32 features comprehensive software that includes a limited voice recognition system, text-to-speech software, and the HSC Interactive authoring package. The Media Vision Pro 3D offers a similar choice of software, but adds superior all-around audio quality and built-in 3-D audio technology. However, Media Vision is operating under a

Most Boards Struggle at Extremes

A lot can happen to an audio signal—and most of it for the worse—when it gets pushed through the pipes. The straight line in the Turtle Beach graph shows how that board maintains the original signal when specific frequencies are recorded through the line-in port and played back through the line-out port. Unfortunately, however, most boards strayed marginally, exhibiting "roll-off" at the lowest and highest ends of the human hearing range. The worst showing—from the Toptek—indicates a severe loss of fidelity.





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Chapter 11 bankruptcy agreement, making it difficult to project the future of its products. At press time, however, Media Vision assured us that its Pro 3D board would continue to be available.

For sound quality only, one board stands out: The Turtle Beach MultiSound Monterey. In fact, the Monterey is the only board we can recommend for professional audio. And while it has significant limitations that make it inappropriate for recreational use—it lacks microphone and speaker jacks and has no Sound Blaster compatibility—anyone relying on sound to create persuasive presentations should consider this product. For bargain hunters, the $129 Wearnes Beethoven ADSP-16 produced clean audio and accurate frequency response—though it lacks wavetable MIDI.

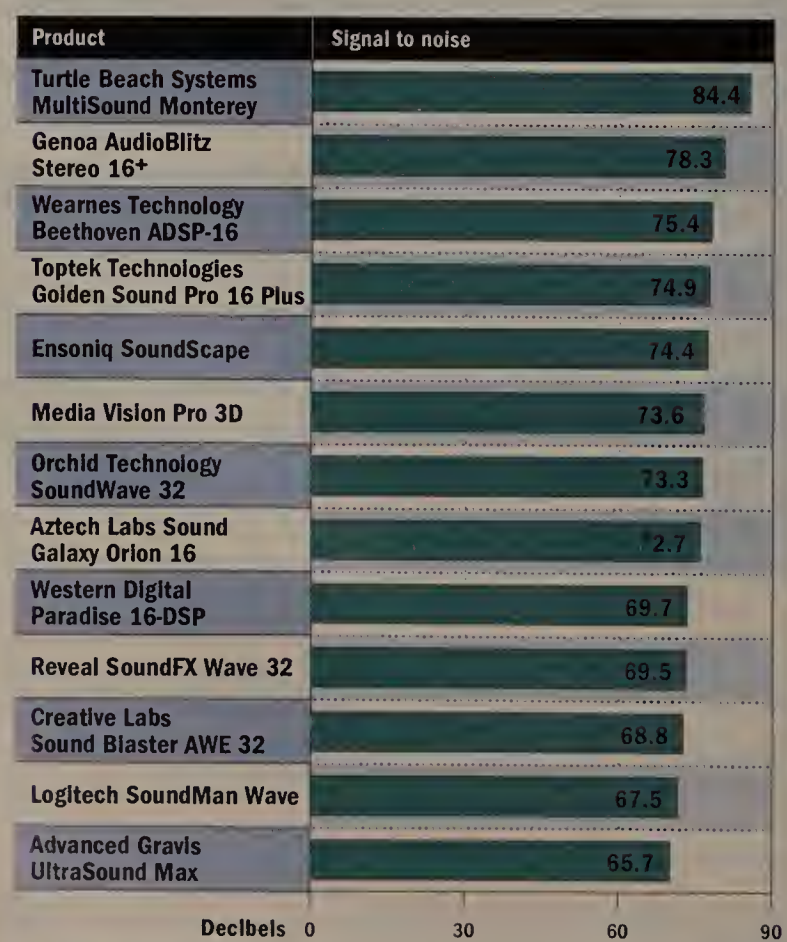
Many boards excelled in one area, only to stumble in another. The Creative Labs AWE32 fared well in reproducing frequencies across the spectrum, but turned in a subpar signal-to-noise ratio. The Reveal SoundFX Wave 32 and Western Digital Paradise 16-DSP shared this problem. The Toptek Golden Sound Pro 16 Plus suffered horrific roll-off on the low end of the frequency spectrum, while the Ensoniq SoundScape and Orchid SoundWave 32 boasted good noise ratios, only to suffer poor frequency response.

TEST REPORT

Turtle Beach Again

Unwanted noise can diminish sound board performance

The inside of your PC is a noisy place electrically speaking, with the CPU, hard drive, and power supply all creating interference that can degrade your sound board's audio quality. The signal-to-noise ratio measures how much louder the desired audio signal is than unwanted noise – a higher number indicates greater clarity. In our tests, only the Turtle Beach sound board limited noise sufficiently for its audio signal quality to match that of a good CD player (80dB). However, all these boards should provide adequate sound quality at normal volumes (70dB is generally considered an acceptable signal-to-noise ratio). All scores are weighted to reflect the sensitivities of human hearing.



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Sound Alikes

If you want a board for recording speech, the news isn't good—with few exceptions, these products were uniformly dismal. We can recommend the Media Vision Pro 3D, Orchid SoundWave 32, Ensoniq SoundScape, and Wearnes Beethoven ADSP-16. Note: A high-quality microphone won't always improve matters. In fact, it may make them worse, because a good mike will cause problems if board and microphone don't work well together.

These boards may diverge in audio quality, but their software is the picture of parity. All include Windows applications for working with WAV and MIDI files, as well as a mixer applet that lets you set volume, change input and output levels, and monitor those levels with a graphical meter. In addition, almost all employ an interface built around a music rack—basically an on-screen version of the stacked audio systems found in many homes, where the CD player, receiver, and amp are stacked on top of one another. The WAV, MIDI, and audio CD players are represented as separate components in the stack. Unfortunately, the modules can be hard to identify, and move around in the stack as components are used.

The Voyetra software found on six of these boards is typical of almost all the products, though Voyetra does feature large buttons and slider hooks that make it easier to use than the Animotion and Turtle Beach software. However, Voyetra's line level meters are generally inaccurate and don't provide metering unless you're already recording.

The versions of Turtle Beach software—Wave SE and Wave Lite, found on the Turtle Beach and Advanced Gravis boards, respectively—may intimidate some users with their crowded interface, mouse-driven knobs, and tiny controls. But if you need the power, you may want to catch Turtle Beach's Wave. If you want more than basic recording, editing, and playback, consider third-party products, such as Software Audio Workshop from Innovative Quality Software, or Sound Forge from Sonic Foundry.

The MIDI of the Road

MIDI software can be even more complex than the WAV programs—not surprising since it caters to musicians creating their own scores. However, we were able to quickly play—and play *with*—MIDI scores, swapping a bass guitar for a set of steel drums. Harmless fun, but the software made it a snap to find, play, and work with scores that would be the backbone of our presentation. Many boards use Midisoft's Recording Session, a competent and relatively intuitive program for playing, editing, and creating MIDI scores.

MIDI quality with most boards was acceptable, if somewhat limited. Even with sampled instrument sounds, the dynamics of the actual notes are not easily recreated; as a result MIDI scores tend to fall a little flat. If you're playing for a crowd, the Turtle Beach MultiSound Monterey combines excellent audio fidelity with very good MIDI playback. Other standouts include the Media Vision Pro 3D, the Reveal SoundFX Wave 32, and the Ensoniq SoundScape. For games and titles, any of these should be adequate.

Many vendors threw in lightweight software packages to sweeten

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SoundPro

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the deal, but Creative Labs and Media Vision stand apart with voice recognition software for handling Windows commands, and text-to-speech software for reading back documents. Aztech Labs bundles Macromedia's Action—a full-featured multimedia authoring program—while Creative Labs and Wearnes throw in the HSC Interactive presentation package.

With so many products offering more features than ever before, use our charts and Best Buys box to make your choice easier.

Michael Desmond is an assistant editor for PC World. *Adam Liberman, who performed the testing, is an independent audio engineer and consultant in Oakland, California.*

FEATURES COMPARISON

New Sound Boards: Options, Low Prices

● Yes
○ No
opt = optional

	Advanced Gravis UltraSound Max	Aztech Labs Sound Galaxy Orion 16	Creative Labs Sound Blaster AWE32	Ensoniq SoundScape	Genoa AudioBlitz Stereo 16+	Logitech SoundMan Wave	Media Vision Pro 3D	Orchid Technology SoundWave 32+ SCSI	Reveal Sound Effects 32	Toptek Technologies Golden Sound Pro 16+	Turtle Beach Systems MultiSound Monterey	Wearnes Technology Beethoven ADSP-16	Western Digital Paradise 16-DSP
Standard features													
Street price	$260	$169	$260	$189	$149	$199	$279	$279	$199	$299	$289	$129	$139
Bit depth	16	16	16	16	16	16	16	16	16	16	16	16	16
Sample rate (kHz)	48	48	44.1	44.1	44.1	44.1	48	48	44.1	48	44.1	44.1	48
DSP chip on board	●	○	●	●	●	opt	○	●	○	●	●	●	●
MIDI: FM/wavetable	●/●	●/opt	●/●	○/●	●/●	●/●	●/●	○/●	○/●	●/●	○/●	●/○	○/●
Card length	full	half	full	full	half	3/4	half	half	full	half	half	half	half
Wavetable MIDI													
Instruments/voices	192/32	128/20	128/32	189/32	128/24	128/24	192/32	208/32	317/32	191/24	128/32	○/○	128/32
Wavetable ROM	512K[1]	2MB	1MB	2MB	2MB	2MB	4MB	1MB	2MB	2MB	4MB	512K	512K
Effects: reverb/chorus	○/○	○/○	●/●	○/○	○/○	opt/opt	●/●	●/●	○/○	opt/opt	●/○	○/○	○/○
Installation													
Diagnostic software	●	●	●	○	○	○	●	○	○	○	○	○	○
IRQ lines available	8	7	4	2	5	6	2	8	4	7	7	8	7
Inputs (line/microphone)	●/●	●/●	●/●	○/●	●/●	●/●	●/●	○/○	○/●	●/●	●/○	●/●	●/●
Outputs (line/speaker)	●/●	●/●	●/●	●/○	●/●	●/●	●/●	○/○	●/○	○/●	●/○	●/●	●/●
External ports marked	○	●	●	●	●	●	●	●	●	○	●	●	○
Line cables/microphone	○/○	●/●	●/●	○/○	○/○	○/○	○/●	●/●	○/○	●/○	●/○	●/○	○/○
CD-ROM drive interfaces[2]	M, P, S	A, M, P, S	C, M, S	M, P, S	M, P, S	SCSI	SCSI	M, SCSI	M, P, S	SCSI	n/a	W, S	M, P, S
Bundled software													
Mixer[3]	AG	Voyetra	CL	Voyetra	MidiSoft	Animotion	MidiSoft	Animotion	Voyetra	Voyetra	TB	Voyetra	Voyetra
Audio recorder/editor[3]	TB	Voyetra	CL	Voyetra	MidiSoft	Animotion	MidiSoft	Animotion	Voyetra	Voyetra	TB	Voyetra	Voyetra
MIDI sequencer[3]	MidiSoft	Voyetra	CakeWalk	Voyetra	MidiSoft	MidiSoft	MidiSoft	MidiSoft	Voyetra	Voyetra	TB	Voyetra	Voyetra
Voice recog/Text-to-speech	○/○	○/●	●/●	●/○	○/○	●/○	●/●	○/●	●/○	○/○	○/○	●/○	○/○
Service and support													
Warranty (years)	3	1	1	3	2	3	3	4	1	1	1	1	3
Toll-free technical support	○	●	○	○	○	○	●	○	●	●	○	○	●
Daily phone support (hours)	8	11	16	10	9	11	14	10	24	9	9	10	8
Weekend support	○	●	●	○	○	○	●	○	●	○	○	○	●
BBS/CompuServe support	●/●	●/○	●/●	●/○	●/○	●/○	●/○	●/●	●/●	●/○	●/●	●/○	●/○
Money-back guarantee	●	○	●	●	○	●	○	○	○	30	○	○	●
Contact													
Phone number	604/ 431-5020	800/ 886-8859	800/ 998-5227	800/ 776-8637	800/ 934-3662	800/ 231-7717	800/ 845-5870	800/ 767-2443	800/ 326-2222	800/ 874-4425	717/ 767-0200	408/ 456-8838	800/ 568-9272
Reader service number	705	706	708	709	710	711	712	713	714	715	716	717	718

Best Buys in red

[1] Uses RAM that can accept MIDI samples downloaded from hard drive.

[2] A = Aztech, M = Mitsumi, P = Panasonic, S = Sony, W = Wearnes.

[3] AG = Advanced Gravis, CL = Creative Labs, TB = Turtle Beach

For more information aboute all products in this table, circle reader service no. 911.

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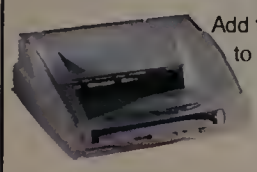

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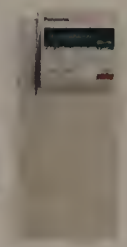

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WINDOWS
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Tips to SUPERCHARGE WINDOWS

Okay, Windows 3.1 is slow. But with a few good, swift kicks, you *can* get it moving. Here's how.

BY SCOTT SPANBAUER

Windows is like the government: It sucks up your resources and then puts them to no apparent good use. Windows exacts its tax from your system in the form of processing power that might be better spent on something useful, like spreadsheet recalcs or database indexing.

You could try to speed up your system by throwing hardware at the problem—a faster processor, hard disk, or video card could make a dramatic difference in your PC's Windows performance. But hardware isn't the only solution. A few judicious software tweaks (if not outright kicks in the seat of the pants) could be all you need to make Windows use your system's resources more wisely and thus make your system run faster.

To help you get up to speed, we present the following tips for optimizing the way Windows works with your system's hard drive, graphics system, modem, printer, and network. And if these no-cost performance boosters aren't enough for you, we've also found a few inexpensive utilities that accelerate Windows in ways mere tweaking can't.

STEVEN GUARNACCIA

SYSTEM RESOURCES

Assess your resources If you have plenty of memory but your system seems sluggish, you may be running out of resources. Windows' System Resources consist of four 64K data storage areas (or "heaps") used by Windows' core programs. Unfortunately, these heaps can become full, resulting in slower performance, not to mention out-of-memory messages. To check on system resources, choose Program Manager's *Help • About Program Manager* command, which will show you the percentage of available resources.

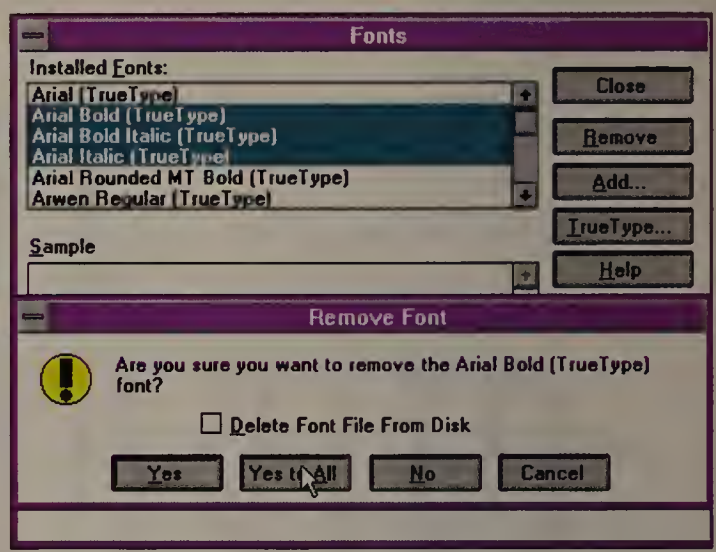
How much should you have free? After Windows is started and with no other programs running, a percentage of free resources in the mid-80s is about as good as you'll get. In the course of running several hungry apps, you may dip down into the 30s with no slowdown. But free resources in the 20 percent range is a red flag.

Close programs Open programs are the biggest resource hogs—simultaneously using every program in your application suite is a good way to make Windows grind to a halt. Even if you have gobs of RAM, avoid running too many programs at once. How many is too many depends on the programs you run—no two use the same amount of resources. If you get an out-of-memory error, if your system slows down, or if apps start to crash, check your free resources. If they're low, close some programs.

Close data files Data files, when open, don't deplete system resources the way programs do. But the "selectors" by which Windows keeps track of open data files can still cause out-of-memory messages, even when you have plenty of available RAM. So it's a good idea to close documents you're not working on.

Reboot, reboot, reboot Applications that claim resources when open but don't give them back when you close them can bleed system resources dry. The only thing to do when you fall victim to such insidious resource depletion is to exit and restart Windows.

Not just off-brand utilities exhibit these bad manners—even some of Microsoft's own programs are guilty (Word for Windows 6.0 is one). To identify poorly behaved programs, note your available resources before launching an app, then again after exiting. If one of your programs doesn't give resources back, avoid opening and closing it repeatedly during a Windows session. You can also check with the manufacturer to see if a more restrained upgrade is available.



GET RID OF NONESSENTIAL FONTS. Windows can display and print acceptable bold or italic characters even if the bold or italic versions of the font aren't on your system.

Unload fonts If you have too many fonts installed, Windows is bound to be wheezing under the load. Remove extraneous fonts with the Control Panel's Fonts applet. Unless you need the highest-quality output, you can also remove the bold, italic, and bold italic versions of those fonts you do use—Windows can still create slightly less-than-perfect italic and bold effects on the fly, based on the normal font style. Don't select the Delete Font File From Disk option, however, unless you're sure you won't want the font in the future.

Pick the right wallpaper Wallpaper gets a lot of flak for using up resources, but its true crime is consuming vast quantities of memory. One of the 16-color wallpaper images that come with Windows won't put much of a dent in your supply of RAM. But use a 256-color, 800 by 600 BMP image to decorate your screen, and you'll lose several hundred kilobytes.

Speed Yourself Up

Maybe instead of just looking for ways to speed up your system, you should look for ways to work faster yourself. Here are five tips to help you out.

Use outlines Most word processors and spreadsheets let you collapse your document into sections, then switch to the section you want to work on and expand it, all with a couple of mouse clicks. In addition to speeding up editing, outlining helps you organize your work.

Use the right mouse button When possible, use the right mouse button to avoid trips to your program's menu or tool bar. While many programs (including Windows itself) ignore the right mouse button, a few—Word for Windows and Excel, for example—put copy, paste, and various formatting commands on a pop-up menu activated by the right button. PageMaker has long employed the right button as a quick zoom toggle.

Use the keyboard Mice and Windows are made for each other, but with most business applications you'll work more efficiently if you keep your hands on the keys. Check your program's help file for a discussion of shortcuts, or note the shortcuts listed to the right of menu commands. Common shortcuts include <Ctrl>-Z for undo, <Ctrl>-C and <Ctrl>-<Insert> for copying, <Ctrl>-X and <Shift>-<Delete> for cutting, and <Ctrl>-V and <Shift>-<Insert> for pasting.

- Keyboard shortcuts can also save time when you're opening applications in Program Manager or switching from one to another. To create a hot key for an application, select its icon in Program Manager, then press <Alt>-<Enter> and enter a mnemonic letter in the Shortcut Key field. Program Manager will automatically prefix <Ctrl>-<Alt> to the letter and voilà, you have a hot key.
- You can create a hot key for Program Manager itself by creating an icon for it in the StartUp group (move to the StartUp group, choose *File • New • OK*, type PROGMAN.EXE in the Command Line field, then choose a Shortcut Key, such as p). Restart Windows, and you'll be able to start any app with a hot key by pressing <Ctrl>-<Alt>-p, followed by the app's hot key.

Reduce the number of program groups Even while closed, each Program Manager program group uses its own share of resources, so the fewer group windows you have, the better. One way to reduce the number of groups is to consolidate your icons. Just drag the icons from one expendable group into another, then delete the old group.

DISK PERFORMANCE

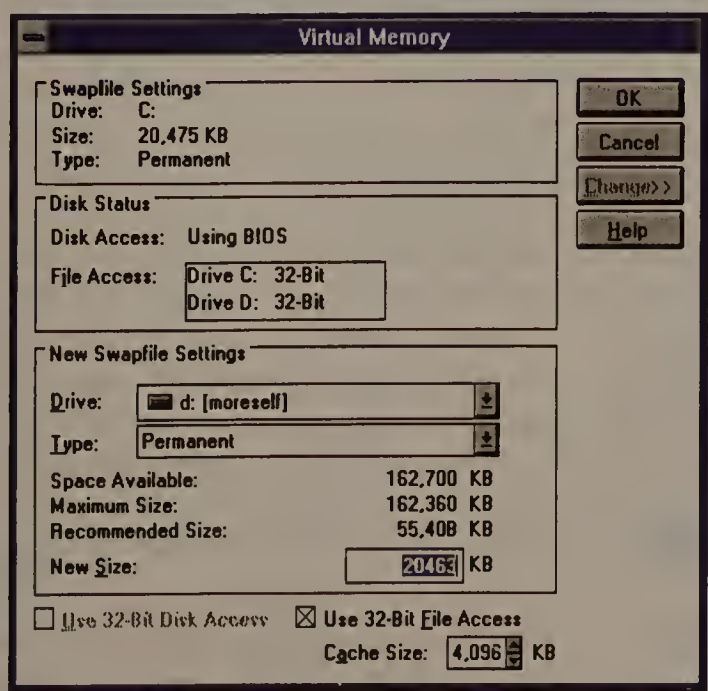
Use a disk cache Disk caches boost your system's performance when reading and writing files by keeping data that's likely to be used in memory. While you can buy a third-party disk caching program, Microsoft's own SmartDrive (bundled with and automatically installed by DOS) does an equally good job speeding up file access (see "Cache Me if You Can").

There's not a lot to futz around with in SmartDrive—chances are it's already optimally configured for your system. On a 4MB system, SmartDrive 5.0 will automatically allocate a 1MB cache when you start DOS, then shrink it to 512K when you load Windows; on an 8MB system, the default 2MB cache shrinks to 1MB. Because SmartDrive configures itself based on the amount of RAM you have, the only time you may need to adjust it is when you add more RAM. Microsoft says you get little benefit from increasing the cache beyond 2MB.

If you really want to tweak SmartDrive's cache size, use the SmartMon utility (included with DOS 6.0 and later versions) to monitor the results of different cache sizes when running Windows. In Program Manager, select *File•Run*, type SMARTMON and click *OK*. Just remember, giving more memory to SmartDrive means taking memory away from Windows—a real *Cache-22*. While a larger cache might improve disk performance, it may actually slow Windows down overall by forcing it to make more trips to the virtual memory swapfile.

Defrag your hard drive Although files are contiguous when you first format your hard disk and install programs, DOS will break them up and scatter them as you work. Fragmented files make your hard disk spend more time searching for all the pieces—a considerably slower process than reading contiguous files. Get things back in order by first backing up your drive, then running DOS's DEFRAG program or a third-party disk optimizer. If it's been a while since you've defragged, it could take several hours to clear up the problem, so plan accordingly.

Use 32-bit disk access Windows 3.1 offers one performance booster that's a genuine no-brainer: 32-bit disk access. With this feature turned on, a device driver intercepts hard-disk access requests to your system's BIOS and executes them faster in protected-mode RAM. To enable it, open Control Panel, select *386 Enhanced* (or *Enhanced* in Windows for Workgroups) click the *Virtual Memory* and *Change* buttons, and select the *Use 32-Bit Disk Access* check box. After you restart Windows you should see 10 to 20 percent faster performance. However, Windows won't offer the check box if you have an incompatible hard disk adapter; also, don't use 32-bit disk access on a portable PC that uses Advanced Power Management.



WHY YOU NEED WINDOWS FOR WORKGROUPS: Its 32-bit file access can provide a dramatic performance boost.

Use 32-bit file access Like 32-bit disk access, Windows for Workgroups 3.11's 32-bit file access can boost performance by 10 to 20 percent or more, making version 3.11 attractive even if you don't have a network. If you've installed Windows for Workgroups 3.11, venture once again to the Virtual Memory dialog box in Control Panel's Enhanced applet and select *Use 32-Bit File Access*.

Since 32-bit file access also has its own caching mechanism, you can set the cache size or let Windows set it for you. Choosing 32-bit file access automatically shrinks SmartDrive's cache while Windows is running (even more than SmartDrive shrinks the cache when you enter Windows). If you have sufficient memory and you use a CD-ROM drive, you may want to increase the cache size slightly.

One problem with 32-bit file access: It doesn't work with DOS 6.0's DoubleSpace disk compression; these incompatibilities are resolved in later versions of DOS. There are also reports of conflicts between 32-bit file access and some DOS applications; if you run into the error message "This Application Has Violated System," disable your 32-bit file access.

Graphics Acceleration

Software graphics acceleration makes your display snappier by streamlining calls to the board's driver or by replacing the driver with a faster one. Binar Graphics' $100 Any View Professional (not yet released as we went to press), for example, accelerates video and lets you change video drivers without exiting Windows. It claims to work with most video adapters. Panacea's $79 Winspeed Pro, due to ship in early 1995, is a rewritten version of its original Winspeed accelerator. It too will support a wide range of adapters, including hardware-accelerated models. PC-Kwik's $100 Power Pak for Windows utilities collection includes KwikScreen, a 256-color Windows video driver. KwikScreen supports boards based on Tseng ET4000, Oak, and Trident VGA chip sets in several resolutions (but only using 256 colors) and claims to accelerate them by up to 70 percent.

WHERE TO BUY

AnyView Professional
Binar Graphics, 800/228-0666
Reader service no. 630

Winspeed Pro
Panacea, 800/729-7420
Reader service no. 633

Power Pak 4.0 for Windows
PC-Kwik Corporation, 800/274-5945
Reader service no. 634

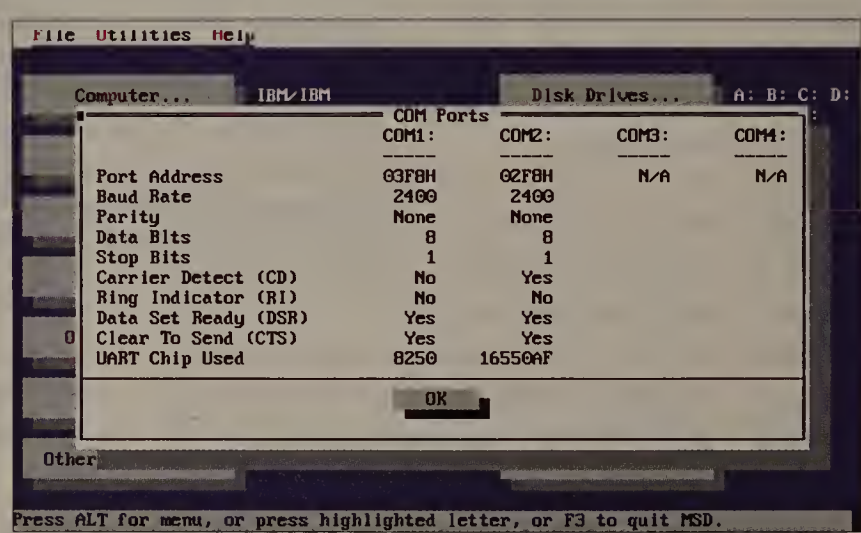
VIRTUAL MEMORY

Don't overtax virtual memory A swapfile is Windows' way of avoiding reality. It allows you to run more programs than your memory actually can handle by swapping your least-active open programs to your hard disk, making room in memory for other programs. Such "virtual memory" works great and staves off out-of-memory messages. But if you're running several hardworking programs in the background (indexing a database or downloading a file, for example) and trying to use another in the foreground, Windows may sputter, and your hard disk LED may light up and stay lit—a sign of overburdened virtual memory. One solution is to buy more RAM. Another is to stop trying to make Windows do the impossible.

Create a permanent swapfile Anytime you install Windows, it will set up a permanent or temporary swapfile for you, depending on the condition of your hard disk. Permanent swapfiles yield faster performance because they're contiguous—the files in them aren't scattered randomly all over the hard disk. Temporary swapfiles quickly become non-contiguous. To change the status of your swapfile, open Control Panel's 386 Enhanced applet, click the *Virtual Memory* button, then the *Change* button. Choose *Permanent* from the Type drop-down list, then enter a number between the recommended and maximum sizes displayed.

Get the swapfile size right How big should your swapfile be? You'll do fine if you use the size recommended in the Virtual Memory dialog box. But if you want to adjust the size yourself, a rule of thumb says the swapfile should be two to three times the size of your RAM—8MB to 12MB for a 4MB system, and 16MB to 20MB for an 8MB system if you can spare the hard disk space. Under normal usage, you won't get much of a speed boost by increasing file size beyond 20MB.

Put your swapfile on a fast disk If you have more than one hard disk in your PC, put the swapfile on the fastest one. Select it from the Drive drop-down list in the Virtual Memory dialog box of Control Panel's 386 Enhanced applet. Don't know which drive is fastest? Pick the newest one, or use a program like Norton Utilities to test disk speed.



DOS'S MSD UTILITY GIVES YOU THE SKINNY on your hardware configuration, including the type of serial port chips installed.

Stop the swap If you have 16MB or more of RAM and don't happen to spend a lot of time running giant databases, editing 24-bit digital images in Photoshop, or using some other heavyweight program that requires several megabytes of RAM, you might want to consider disabling Windows' virtual memory altogether. Choosing *None* from the Virtual Memory dialog box's Type drop-down list will turn off swapping and delete the permanent swapfile, and this should free up a healthy chunk of disk space. If you start to get out-of-memory error messages (which slow you down a lot more than swapping does), just turn the virtual memory back on.

Defrag first A fragmented disk not only slows down disk accesses (see above), it limits the size of the permanent swapfile you can create. If the 386 Enhanced applet's Virtual Memory dialog box shows a maximum swapfile size smaller than the amount of free disk space, it's because your hard disk is fragmented. If you want to increase the size of your permanent swapfile, first delete it: Open Control Panel's 386 Enhanced applet, click the *Virtual Memory* button, then the *Change* button, and choose *None* from the Type drop-down list. Exit Windows and run DOS's DEFRAG program or a third-party defragger. Next, restart Windows and recreate your swapfile with Control Panel's 386 Enhanced applet. You don't have to delete the file every time you defrag the hard disk, only when you want to create a new permanent swapfile or increase the size of an old one.

Don't put your swapfile on a network or RAM drive For the best possible virtual memory performance, don't put your swapfile on a network drive. Thanks to all the hoops data must jump through to get back and forth between the server and your system, these remote drives are slower than the drives on your system. And don't be tempted to put your swapfile on a RAM disk. Even if you had tons of memory, you'd still be swapping data to the virtual disk in memory because—that's right—Windows ran out of memory.

Make way for a bigger swapfile If you're tight on disk space, a thorough housecleaning can easily net you a few extra megabytes better used for a swapfile. Here's a few quick tips for clearing out the dead wood:

- Run CHKDSK or SCANDISK occasionally to find lost clusters (exit Windows first). If the programs find any, they'll deposit the remains in your root directory in a series of files that end with CHK. Look at these files (enter **COPY** *filename* **CON | MORE** at the DOS prompt); if they don't contain crucial data, delete them.
- Delete TMP and BAK files and files that begin with ~WOA (again, exit Windows first). Many of these will reside in your WINDOWS or TEMP directories; if you don't know where that is, look in AUTOEXEC-

Tweak Your Disk

If you think the only way to get a faster hard drive is to buy a new one, check out Ontrack's Drive Rocket, a $40 IDE hard disk accelerator driver that claims to increase disk performance by as much as 80 percent. Normally, your system's BIOS reads your hard disk one sector at a time. Drive Rocket instead enables your system to read multiple sectors at once. And Drive Rocket coexists happily with Windows' 32-bit disk and file access.

WHERE TO BUY

Drive Rocket
Ontrack Computer Systems, 800/752-1333
Reader service no. 646

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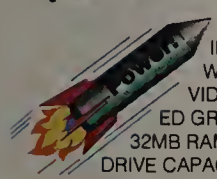

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Faster COM

Windows can communicate at speeds up to 57,600 bps, but all bets are off if you're using a DOS comm program under Windows. For one thing, DOS programs expect to address COM ports directly, instead of through layers of drivers. Worse, though Windows supports the 16550A UART's improved buffers, this support isn't passed on to DOS programs. As a result, you may run into errors at high speeds.

But fear not: Several manufacturers sell drivers that offer better high-speed support for DOS comm programs, as well as additional conveniences. E-Ware's $49.95 KingCom, for example, replaces your Windows COM driver with a more UART-friendly version. It makes it easier to use all four physical COM ports on your system simultaneously and to resolve port conflicts, and it even lets you set up as many as nine virtual COM ports—one for each communications, fax, or file transfer program you use. Similarly, Cherry Hill Software's $99 HiCom/9 driver expands Windows support for 16550A UARTs and supports I/O hardware with as many as nine physical COM ports. (It can't, however, create virtual COM ports like KingCom.) Pacific Commware's $30 TurboCom/2 replacement serial driver supports COM1 through COM4, improves the DOS program/16550A UART interface, and claims to enhance UART usage by Windows programs as well. The company's $69.95 TurboCom/2 Plus supports up to 9 physical COM ports for users of multi-port I/O boards.

WHERE TO BUY

KingCom
E-Ware, 800/892-9950
Reader service no. 649

TurboCom
Pacific Commware, 800/856-3818
Reader service no. 650

HiCom/9
Cherry Hill Software, 518/786-3158
Reader service no. 651

.BAT or else enter SET at the DOS prompt.

- Use Windows Setup to remove elements such as wallpaper, help files, and screen savers, and utilities like Schedule Plus, Calendar, Mail, and so forth, that you don't use. Choose *Options•Add/Remove Windows Components*, then deselect the elements you want to get rid of and click *OK*.

COMMUNICATIONS

Pick your fastest port To communicate at speeds higher than 9600 bps, especially when using a DOS communications program under Windows, you need to choose a properly equipped COM port. Every serial port on your system is managed by a chip known as a Universal Asynchronous Receiver and Transmitter. Older UARTs, such as the 8250 or the 16450, ably handle 2400 bps transmissions, but tend to lose data at higher rates. Newer 16550A UARTs have better buffering, which supports transmission rates as high as 115,000 bps.

To see which UARTs are installed on your system, exit Windows and run the MSD utility included with DOS 5.0 and later by entering MSD at the DOS prompt. Once in the program, press C to examine your COM ports. The type of UART installed for each of your ports appears at the bottom of the screen. If both ports are equipped with 8250 or 16450 UARTs, and you're ready to accelerate reliably beyond 2400 bps, you can replace your computer's I/O adapter with one equipped with a 16550A or clone UART. Or, you may want to purchase an up-to-date internal modem, since most internal modems and fax-modems have their own UARTs.

Configure your ports Even if you have a 16550A UART, you may need to tweak Windows' COM port settings to get top performance from the latest modems (anything over 9600 bps). In Control Panel, double-click *Ports* and then the icon for the COM port you want to set up. To maximize communications performance for a 14.4 kbps or faster modem, choose *19,200* from the Baud Rate drop-down list and choose *Hardware* in the Flow Control drop-down list.

Give DOS programs a boost Even if your Windows comm programs can send and receive at high speed without a hitch, DOS communications apps running under Windows may have more difficulty. If your DOS applications tend to drop characters or lose connections with remote systems at 9600 bps or faster, try one or all of these tips:

- Close as many other apps as you can.
- Run your comm program full-screen instead of in a DOS window. To switch from a window to full-screen display, select the window and press <Alt>-<Enter>. To run in full-screen mode all the time, open the program's PIF file in the Windows PIF Editor utility, and select *Full Screen*.
- If you run your DOS communications application in the background during a data transfer, run it minimized as an icon rather than in a window. To ensure that the comm program will continue running correctly when you switch to a different foreground app, open the PIF file in the PIF editor and select the *Background* check box.
- Increase the Background Priority and Foreground Priority numbers in your program's PIF file. To find these numbers, click the *Advanced* button to go to the second screen of PIF options. Try doubling or tripling the numbers.
- Click the *Lock Application Memory* check box in the Advanced screen of your program's PIF file. This prevents Windows from swapping your DOS program to disk with virtual memory, which would slow down its responsiveness to incoming data.
- If none of these tricks succeeds in clearing up the problem, you may need to edit your SYSTEM.INI file. Open the file in Notepad by using Program Manager's *File•Run* command, entering SYSTEM-

FOR HIGH-SPEED COMMUNICATIONS UNDER WINDOWS, use the port with the fastest UART, set baud rate to the max, and let the modem control the flow of bits.

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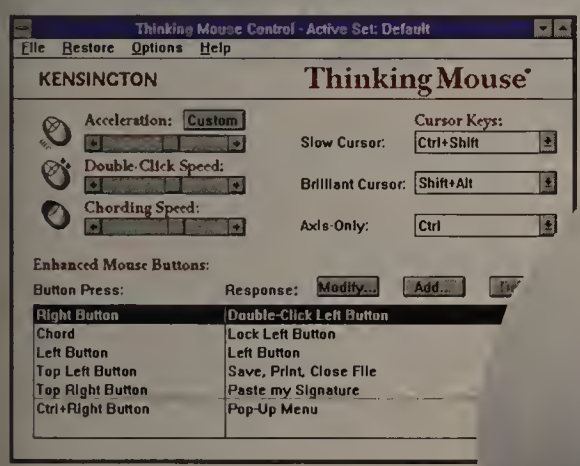

Thinking Mouse Control Panel

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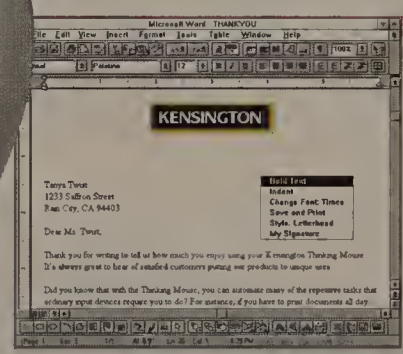

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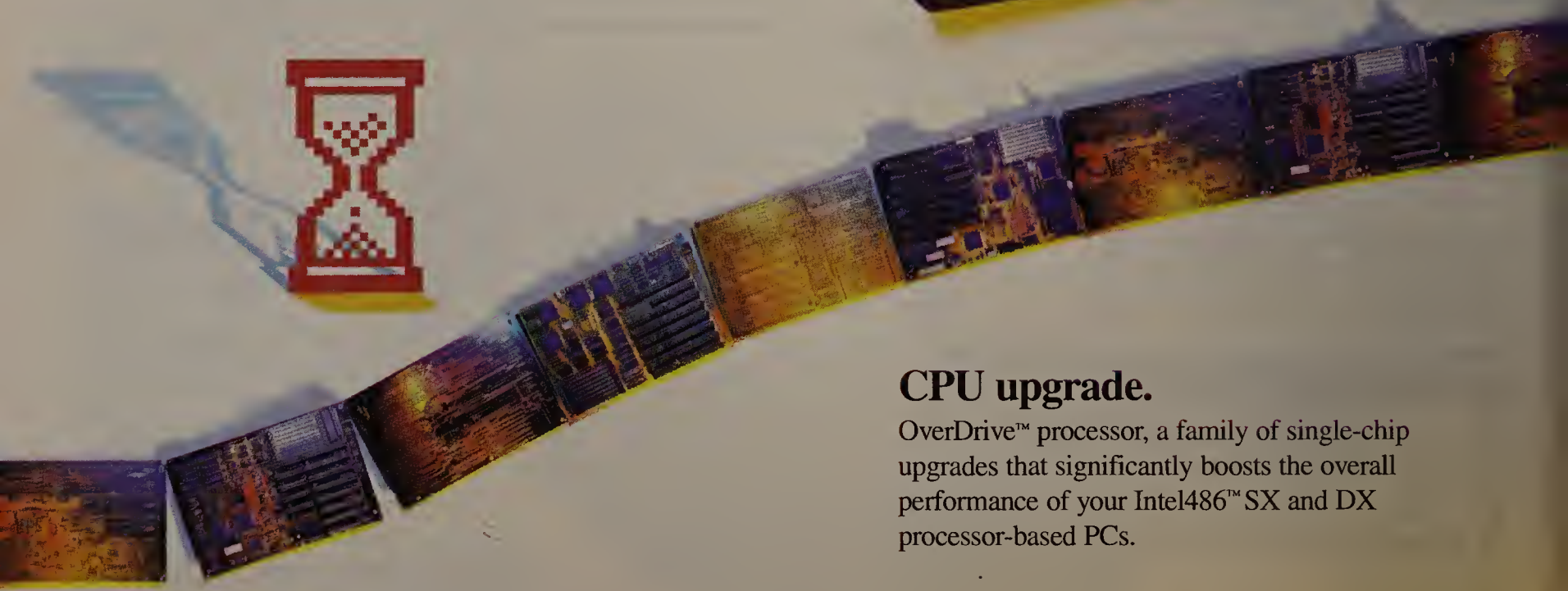

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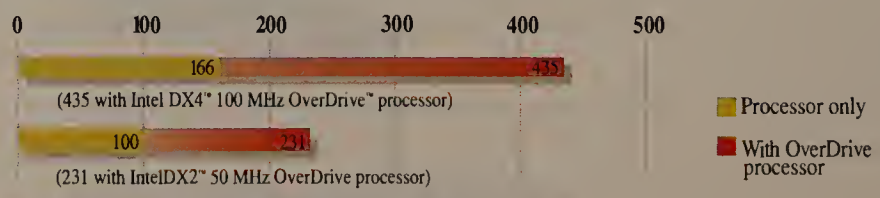

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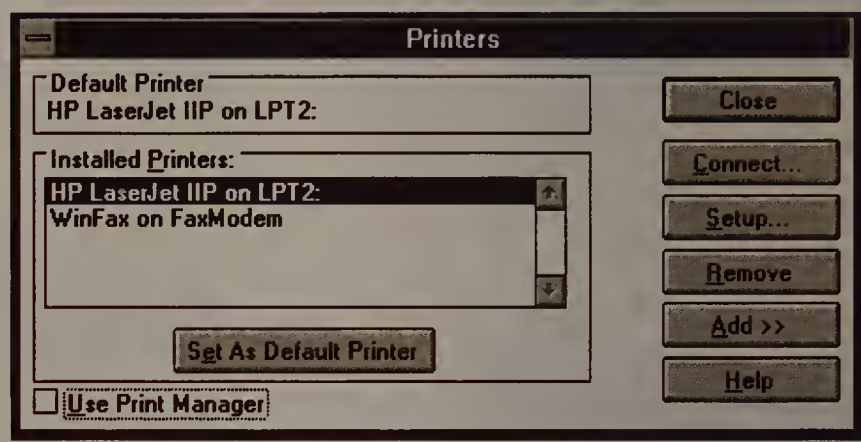
.INI in the resulting dialog box, and clicking *OK*. Locate the [386Enh] section and the COMBoostTime= statement; if you don't find it, add it. Then set the COMBoostTime= statement to 4 (the default value is 2). You can specify a higher value, but be conservative, since setting it too high can actually slow communications down. In the same section you can also try boosting the COM*x*Buffer= statement (where *x* represents the COM port you want to tweak). The default value is 128—try increasing it to 1024 or 2048. As with COMBoostTime, you may have to add this statement, and setting it too high can impair performance. If you aren't losing data in transmissions, or never transmit at rates higher than 2400 bps, leave these settings alone.

PRINTING

Turn off Print Manager If you're not on a network, turning off Print Manager will make the pages come out of your printer faster. To turn it off, clear the *Use Print Manager* check box in Control Panel's Printers applet. One warning: While disabling Print Manager will make for faster printing, it may also make you wait longer to resume working in your application. If, on the other hand, you're printing from a program like Word 6.0 for Windows that has its own built-in spooler, you shouldn't experience any delay.

Print directly to port Whether or not you use Print Manager, there's an easy way to speed up printing to local printers: Open Control Panel, double-click the Printers icon, and click the Connect button. In the resulting dialog box, check the *Fast Printing Direct To Port* check box.



TURN OFF PRINT MANAGER and you'll get faster printing—though you might spend more time waiting for your app to become usable again.

Update your printer driver You'll find that Windows will print faster on some printers (older models of Hewlett-Packard's DeskJet, in particular) if you update their printer drivers. Check with the printer manufacturer to see if a newer driver is available, or consult the Microsoft Download Library (GO MSL on CompuServe, or call 206/936-6735).

MEMORY

Don't manage memory Memory managers are great for running DOS programs on today's PCs, where the abundance of drivers and TSRs necessary for mice, CD-ROM drives, SCSI adapters, and the like can leave you with as little as 400K of conventional memory—not enough to run many games and databases, or even some programs. Memory managers like DOS's EMM386.EXE, Quarterdeck's QEMM, or Helix's NetRoom solve the problem by stuffing some or all of those drivers and TSRs into the reserved area between 640K and 1MB. But this behind-the-scenes RAM flimflam slows overall system performance by about 10 percent. Windows and most Windows applications don't need much conventional memory—in fact, Windows will load with as little as 256K of conventional memory. So if you don't run RAM-greedy DOS programs, try disabling your memory manager. Just put the word REM and a space in front of the DEVICE=EMM386.EXE statement in CONFIG.SYS.

Avoid expanded memory Some DOS programs, like 1-2-3 version 3.1 and Desqview 386, almost demand expanded memory, which is slower than extended memory and requires you to dedicate 64K of extended memory to the expanded memory page frame. That's 64K that DOS and Windows can't use. So if you don't need expanded

Cache Me if You Can

A disk cache is one of the most efficient ways to speed up your PC, and SmartDrive, which comes free with both DOS and Windows, is one of the fastest disk caches available. (In fact, only Golden Bow's Vcache 6.1 did better in a recent round of Informal testing we did at *PC World*.) Yet even though SmartDrive is free, third-party disk-caching programs continue to be hot sellers. Why? Because speed isn't everything. What sets third-party caches apart are the extra features they provide—like dynamic sizing, which intelligently shrinks the cache when other programs demand more system memory, and CD-ROM caching that's faster and more flexible than SmartDrive's. These third-party options often come with other nifty utilities, such as screen accelerators, diagnostic programs, and companion memory managers. So are third-party disk caches worth the extra cash? In some cases, yes. In our testing, Vcache produced the best performance. Helix's NetRoom 3 is excellent if you need to maximize memory as well as cache your disks. And the all-inclusive PC Tools comes with a healthy collection of extra utilities that DOS simply can't match. Still, for most users SmartDrive is plenty fast enough, and you'd be hard put to beat the price. —TJ Byers

WHERE TO BUY

Cache86 v5.01 $89.95,
The Aldridge Company,
800/548-5019
Reader service no. 861

Multimedia Cloaking $39.95,
Helix Software,
800/451-0551
Reader service no.862

NetRoom 3 $99.95,
Helix Software,
800/451-0551
Reader service no. 863

Norton Utilities $179,
Symantec Corp., 800/441-7234
Reader service no. 864

PC Tools PC-Cache 9.0 $49.95,
Central Point, 800/964-6896
Reader service no. 865

Super PC-Kwik 6.0 $49.95,
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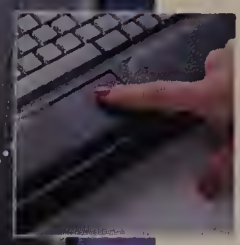

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memory, disable it. In CONFIG.SYS, add a space and NOEMS to the end of the EMM386.EXE command line.

GRAPHICS

Lower Your Resolution Your video adapter may support 16 million colors at high resolutions, but all those colors add up to a burden on your system, which has to schlep them from the hard disk to the display. Install a lower-resolution display driver with fewer colors to speed things up. Double-click Windows Setup, select *Options • Change System Settings*, and pick a new driver from the Display drop-down list. Setup will tell you to restart Windows so the change takes effect.

If Windows won't restart or goes haywire, your new driver doesn't work with your display. No trouble—just reboot, and at the DOS prompt switch to the Windows directory and enter SETUP. Now you'll be able to install a new driver, reinstall your original drivers, or use the plain vanilla VGA driver that comes with Windows.

Update Your Video Drivers If you've had the same graphics board for a while, chances are the drivers you're using are outdated. Reputable video board manufacturers regularly improve their drivers and post the updates on a BBS—all you have to do is download and install them. One warning: New drivers can be buggy, so keep old ones around until you have a chance to road-test updates.

NETWORKING

Skip the network If you use Windows for Workgroups but don't need access to other computers, you can open Windows faster and free up memory by disabling WFW's network connection. Just invoke Windows with the command WIN /N.

Prioritize Sharing If you are on a Windows for Workgroups network and find that sharing drives and resources is slowing your system, you can adjust the priority given to other users' requests. To dedicate more CPU time to your own needs, open Control Panel, double-click *Network* and move the slider bar toward Applications Run Fastest.

MISCELLANEOUS TWEAKS

Ration RAM with PIF files Save memory (and minimize disk swapping) by setting the *KB Required* and *KB Desired* values in your DOS apps' PIF files as low as possible. Start by setting both at 512K, then try launching the program. If all goes well, reduce each setting by 64K increments until you receive an error message, then bump it back up to the last value that worked.

Leave File Manager in the dark Speed up file accesses by DOS apps running under Windows by adding the line **FileSysChange=no** to the [386Enh] section of SYSTEM.INI. Adding this line means Windows won't constantly update File Manager about changes DOS programs make to files or directories. To update File Manager's display manually after a change made in DOS, press **<F5>**.

Get rid of your screen saver Screen savers used to be practical—monitors of yore, if left on for a long enough time, could get an image "burned" into their phosphors. Newer monitors don't have this burn-in problem, so aesthetic considerations aside, Windows screen savers now do little more than consume processor time, system resources, memory, and disk space. Lose 'em.

Bypass the StartUp group Use a little less memory and system resources by holding down the <Shift> key while Windows loads. Windows will skip loading the programs in your StartUp group (but not programs specified by WIN.INI's LOAD= or RUN= statements). You can achieve the same effect for all future Windows sessions by simply emptying your StartUp group altogether.

Streamline Control Panel Unclutter Control Panel by listing the applets you never use in a [Don't Load] section of CONTROL.INI. To open the file, select *File • Run* in File Manager, type **CONTROL.INI** and pressing **<Enter>**. Type **[Don't Load]** on a line by itself at the end of the file. Follow it with a statement, one per line, for each applet you don't want to load using the form *module*=**TRUE**, where *module* is the name of the applet as it appears in Control Panel.

Scott Spanbauer is a contributing editor for PC World.

Going by the Book

Want more advice? You could consult a book, but which one? We reviewed the field and found the books that will get your system speeded up fastest.

Souping Up Windows

by Ned Snell, Sams Publishing, $29.95

Reader service no. 652

This book's subtitle says it best: "Turn Your PC Into a Windows Hot Rod!" *Souping Up Windows* is a gold mine of performance-enhancing tips. Topics range from optimizing memory and hard disks to using a desktop or a notebook efficiently. (Many books overlook mobile computing.) In addition to the book's "Soup-up Kit" (two floppies jammed with utilities), appendices provide basic PC operational techniques and explain where to find parts and accessories.

Troubleshooting Windows

by Mark Minasi, Sybex, $27.95

Reader service no. 653

This book's premise: The best way to speed up Windows is to keep it (and DOS) from slowing down. An engaging teacher, Minasi describes what's under Windows' hood and how to keep memory, video, drives, and even networks running well. His discussion of what you should and should not expect when multitasking is particularly good. The layout is staid, but all the info you need is there.

Windows 3.1 Configuration Secrets

by Valda Hilley and James M. Blakely, IDG Books Worldwide, $49.95

Reader service no. 656

These two clearly don't know how to keep a secret. This 832-page behemoth is brimming with performance-tweaking tips, covering everything from initial Windows setup to powering down. No aspect of Windows computing is ignored—memory, storage, and graphics are dissected—and you'll find less frequently covered topics such as printing, telecommunications, and multimedia. The book includes three floppies with more than two dozen Windows configuration tools and utility shareware programs. —Michael S. Lasky

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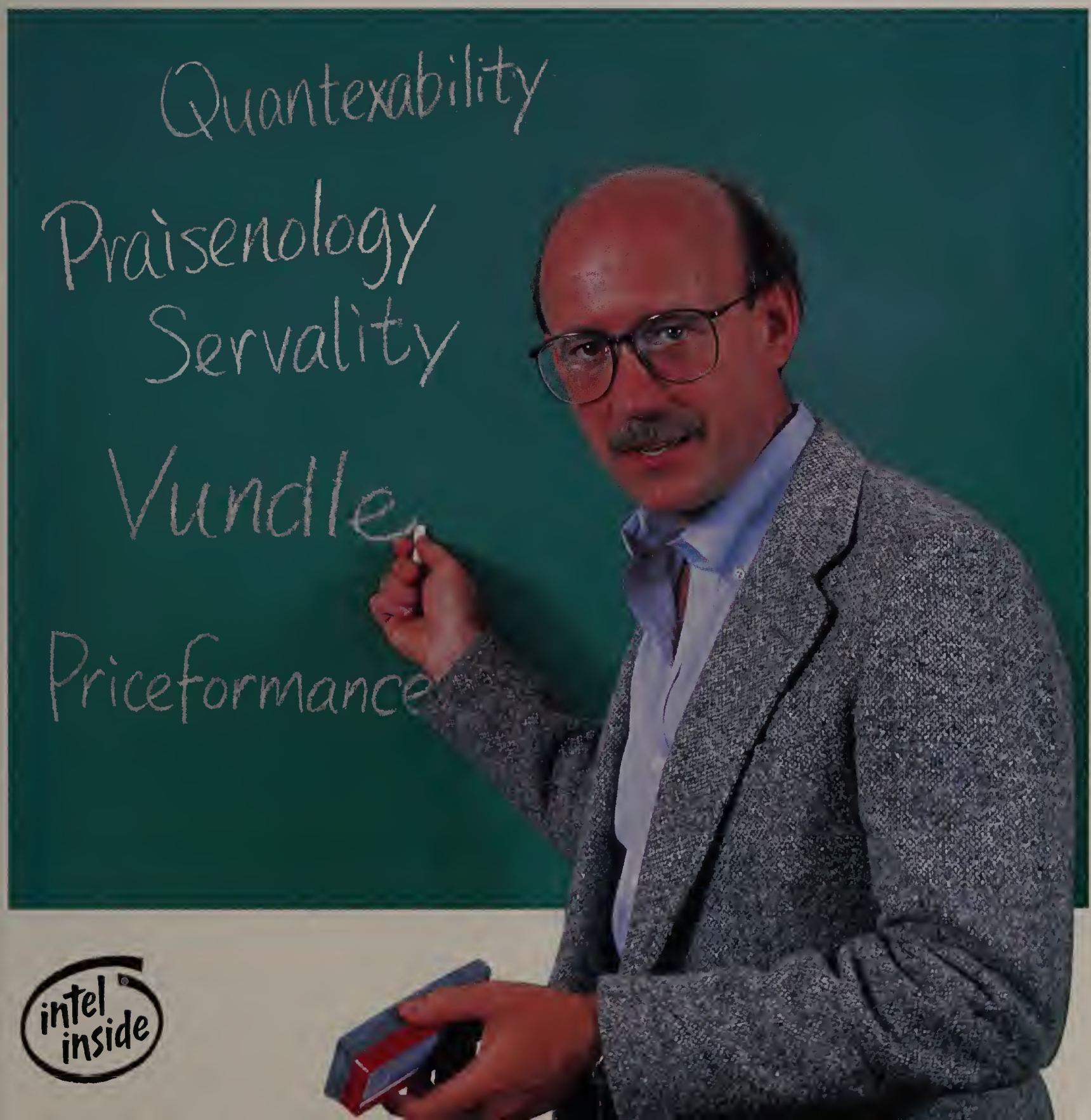

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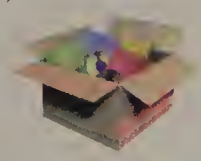

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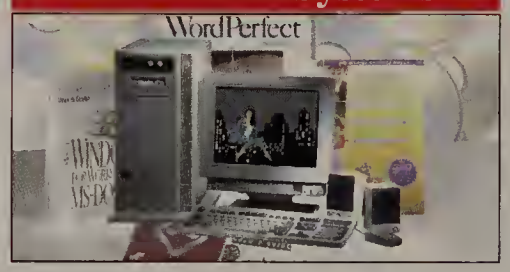

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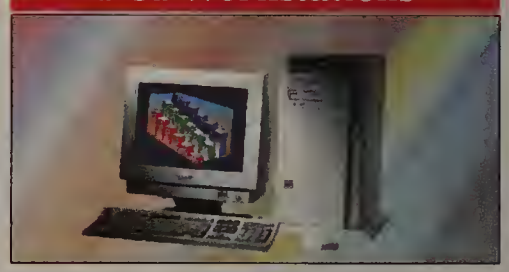

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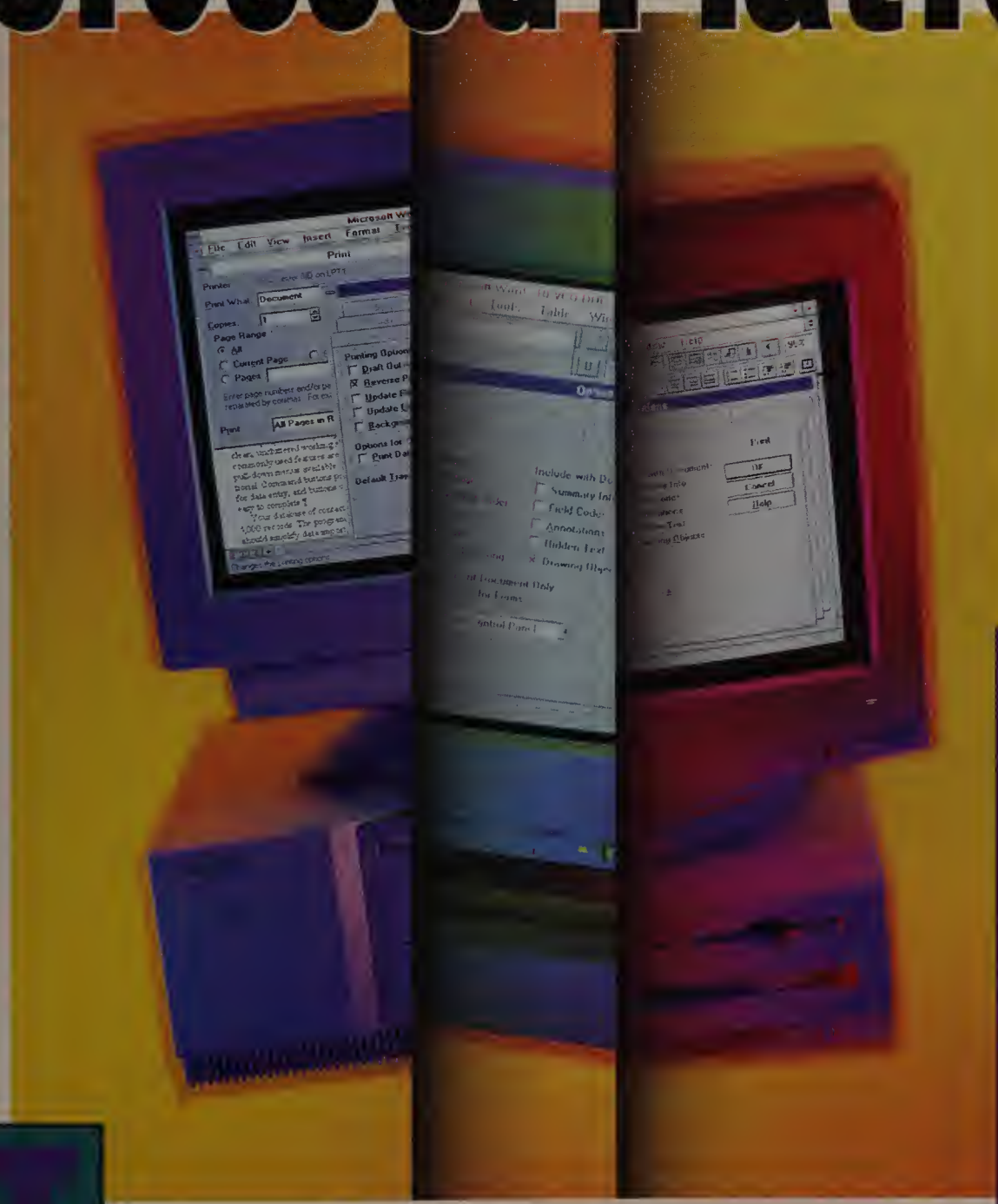


If you think it was tough getting the PLO and Israelis to talk, just try getting PCs, Macs, and Suns to communicate. Three multiplatform offices reveal their successes and failures.

The worlds of PCs, Macintoshes, and UNIX workstations are as different as Mars, Venus, and Earth: Each has its own gravity, weather patterns, and atmosphere; nobody on any one of them thinks the others can support life.

The difficulties confronting users in multiplatform offices are legion. There are fonts that behave differently on the Mac than on the PC, cross-platform E-mail packages that never quite cross platforms, and the all-encompassing human factor: PC users often think of Mac people as computer-phobes or fanatics, Mac users may view PC types as bullies, and UNIX folks sometimes see PC and Mac users as computer kindergartners. The "my platform's better than yours" debate can disrupt productivity and turn an otherwise normal office into a battlefield.

PC World set about exploring the universe of the multiplatform office, talking to three organizations that found down-to-earth solutions. Find out how they coped with their problems.

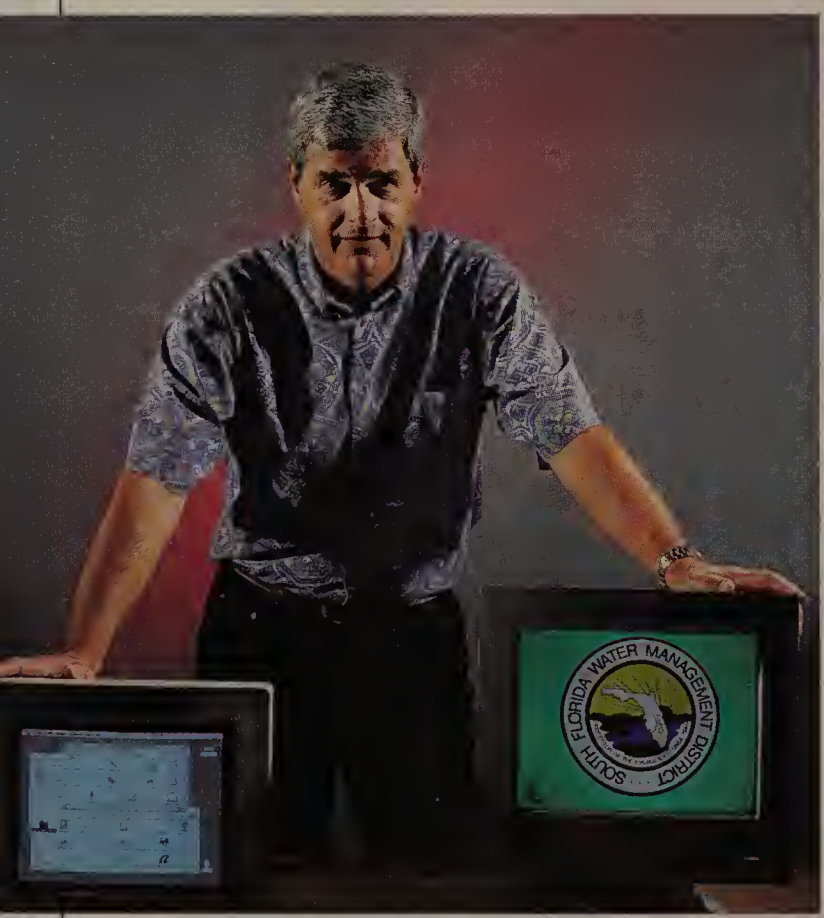
By Bronwyn Fryer

PHOTOGRAPHY: ROBERT CARDIN; COMPOSITION: JEFF BERLIN

South Florida Water Management District: Lines of Communication

When you have to bring Macs into a PC-standard environment, it's time to gear up the tech support staff. Throw in the need for an E-mail package that runs on everything but the microwave oven, and you've got a modern-day Tower of Babel.

When some of the scientists working at the South Florida Water Management District (SFWMD) wanted their own Macintoshes, it caused reverberations throughout the 1600-employee organization. Not that there wasn't already plenty of variety: Most employees had PCs; many scientists and civil engineers used Sun workstations; and most of the graphic artists used Macs to produce brochures and reports.



BRINGING THEM INTO THE FOLD: SFWMD's Bob Haine had his PC technicians reach out to Mac users.

According to Bob Haine, a senior analyst and on-site technical instructor, the scientists' demands for Macs became something of a sticking point with the PC-centric tech support staff. "The scientists needed to use very specialized software that was available only on the Mac," he recalls, "but we didn't have enough technical support people who were familiar with the platform."

And with the Macs came security problems. The district protects its computing systems against intruders and viruses by controlling what software people can use, but "a Mac program from someone's home went out over the district's network and brought a section of the LAN to its knees," Haine recalls. "The network was down for a couple of days before we got it up and running again."

Luckily, the Mac users and PC-oriented support staff eventually buried the hatchet—and not in a monitor or someone's head. In an effort to incorporate Mac users into the fold, SFWMD provided them with their own dedicated technician, a separate print server, and a PowerBook portable that could be checked out to take on the road—a benefit that their PC-using counterparts had long enjoyed. The rules about extracurricular software are still in place, but users have learned that there are good reasons to abide by them. In hindsight, Haine reflects, "If the PC support staff had been more knowledgeable about Apple hardware and software, the cross-cultural problems could have been smoothed over."

But once the employees were willing to talk to each other, they still had to overcome barriers to communicating. The problem was finding a fully functional, cross-platform application that combined E-mail and calendaring capabilities. "Calendaring is tough," says Haine. "Most of the applications out there are very platform-oriented."

The SFWMD spent a year evaluating E-mail/calendar packages. The easy part was finding two E-mail packages that worked on both Mac and PC platforms: WordPerfect Office (now called WordPerfect GroupWise) and Lotus's cc:Mail. But the district also needed a workable, cross-platform calendaring system that could be tied to one of these packages. The only calendaring programs that supported cc:Mail were strictly PC-based. WordPerfect Office came with its own built-in calendar module, but the district found a bug in the module that hung up Sun workstations. "WordPerfect told us it was a problem with the Sun operating system, but we found that it's a documented WordPerfect bug. If they couldn't fix this problem, we wouldn't have wanted the product," says Haine, who was clearly frustrated by the impasse.

Problem: Finding a reliable cross-platform E-mail/calendar program.

Solution: Possibly WordPerfect GroupWise 4.1, currently in beta testing.

"We're ready to go into a pilot program with GroupWise now."

Problem: Users employing illicit Mac software, some of it causing network crashes.

Solution: More Mac training for support staff, better communications.

"If the PC support staff had been more knowledgeable about Apple hardware and software, the cross-cultural problems could have been smoothed over."

Whatever it claims, WordPerfect appears to be fixing the bug, Haine says, judging from a beta copy of WordPerfect GroupWise 4.1 he has looked at. "We're ready to go into a pilot program with GroupWise now," Haine reports.

Fortunately, the SFWMD is finding it easier to locate other workable cross-platform applications. The district has standardized its spreadsheets on Lotus 1-2-3 and its word processing on WordPerfect, both of which run on all three platforms. So those choices, Haine says, "have worked out well." In most cases, a file created on one platform can be transferred to another platform without reformatting.

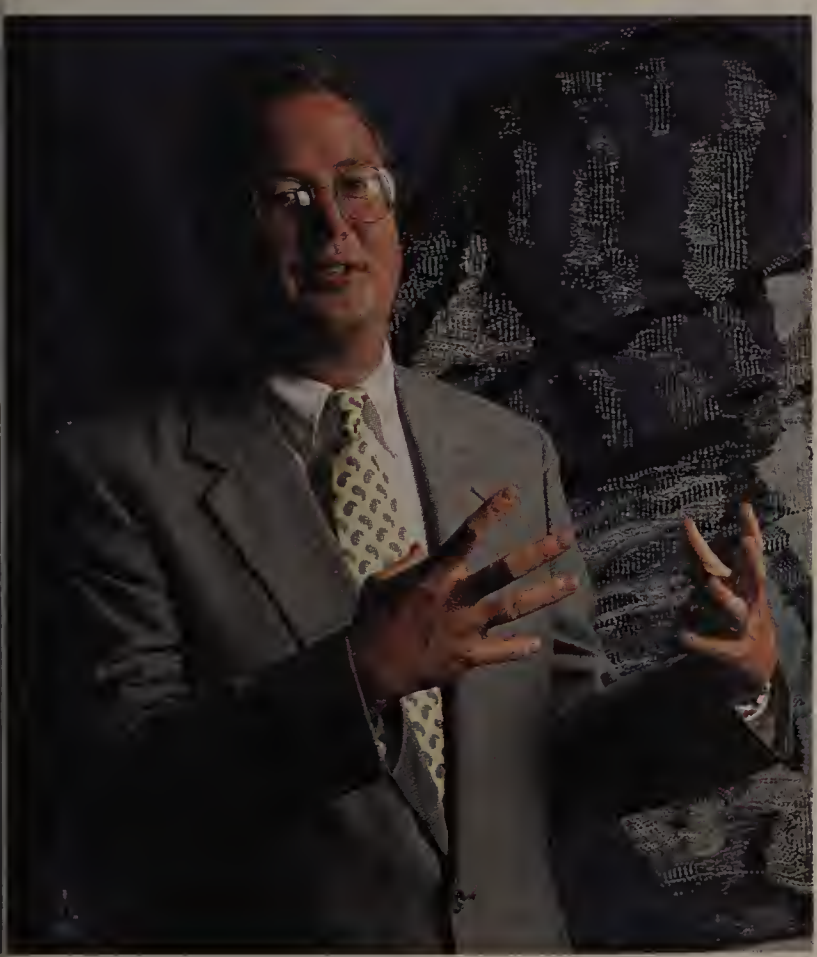
Finally, the district is exploring the possibility of purchasing new Power Macintoshes, the recently introduced PowerPC-based Macs that can run DOS and Windows applications through hardware emulation (see the sidebar "The PC With Two Brains"). The district's Mac-using departments are already budgeting for the Power Macs, in the hope that the new computers can help solve some of the cross-platform problems. "The Power Mac is supposed to run PC and Mac applications at the same time," Haine remarks. "If they really do that, it will be a real benefit."

SHAW MCKUTCHEN

Glaxo: Great Expectations

Announcements of the latest-and-greatest software upgrade can tempt any user to jump the starting gun. But when whole departments at Glaxo, Inc., got stuck between separate PC and Mac releases of its standard word processor, the race seemed permanently delayed.

Glaxo is the U.S. subsidiary of Glaxo Holdings, the second-largest pharmaceutical company in the world. According to Marc Graham, a senior systems manager responsible for supporting 800 users in the company's research and development arm, most of Glaxo's workers use either a Macintosh or a PC to run the company's standard applications, such as Microsoft Word and Microsoft Excel. And each group is certain that it's running those applications on the right platform. "Operating systems and computing platforms are like religions," Graham notes. "Whatever you learn on is what you like best. I'm what you call a 'Windows bigot'; some of the scientists are hooked on their Macs. We all go to different churches, but we have to work together."



VIEWING DATA ACROSS PLATFORMS was Glaxo's real problem, and Marc Graham had to find multiple solutions.

DONNA BISE

Culture clashes are most evident when it's time to upgrade software. "In a huge, global company like this," says Graham, "trying to keep everyone on a smooth upgrade path is very tricky. Everything is a constant game of waiting for the next update." For example, many employees were still working with version 5 of Word for the Macintosh when Glaxo upgraded to Word 6.0 for Windows. "There were things in WinWord 6.0 that the Mac version didn't yet support. What do you do? You can't tell Windows people that they can't upgrade; they're champing at the bit. So we put out a list of features that the Mac doesn't have, and asked Windows users to avoid those features if they are sharing files with Macintosh users."

Problem: PC and Mac versions of the same software are often quite different.

Solution: Ask Windows users to avoid certain features if they share files with Mac users.

"You can't tell Windows people that they can't upgrade; they're champing at the bit."

But Glaxo's complicated "process maps" were beyond the capabilities of Word. The company's Medical Operations Division creates these large, complex charts on PCs using Microsoft PowerPoint. While the charts themselves could be imported easily into PowerPoint for the Mac, the pop-up instructions that were hot-linked to them could not. And users on both platforms needed to access the instructions as well as the visuals. At first, Glaxo had to settle for a laborious paper compromise: color-photocopied "map books" that cost $5000 to produce. And that was to get a mere 150 copies sent throughout the world. Worse, by the time receiving departments could manually insert updates, they were usually out-of-date.

Graham found a better solution in Adobe Acrobat, an application designed for just this sort of problem. Once a document has been translated into Acrobat's Esperanto-like file format, Mac and Windows users can easily examine and search it. That way, Glaxo employees on different platforms can all view the electronic maps and written instructions. "If you're new at Glaxo, you can just click your department icon for readable explanations of everything you need to know," says Graham. Employees can also search Acrobat documents for specific text strings, which is a real plus when they're hunting through a document consisting of hundreds of pages. Now the Medical Operations Division can easily keep process information up-to-date and distribute it to 800 users for a tenth of what the former paper-based process cost per user. And no one has to keep outdated manuals around.

But users, often from different workgroups, also wanted to share less-formal documents and needed a way to pass files back and forth. So Graham and his colleagues created areas on various network file servers where all users had full privileges, allowing them to store and retrieve ASCII documents. "The PC and Mac people have an area on the network server called PC Common," he explains. "Anyone can drag a file there to let others access it." In addition, users are gradually replacing many of the read-only files in the PC Common area with Acrobat documents.

Of course, whenever you have PC and Mac users sharing files, you often have confusion. For one thing, Mac users can have difficulty remembering DOS's file-naming limitations. And if Mac users need to get on a PC occasionally—which happens more often than one might think—they can get really confused. "The Mac hides the file system from the user, but when you're trying to get to a file off of a network server with File Manager, you have to understand the directory tree," Graham explains. "Still," he says of the PC Common area, "it's better than nothing."

Problem: Complicated map-and-text documents can't move from PC to Mac.

Solution: Use Adobe Acrobat, which can display the documents on both platforms.

"If you're new at Glaxo, you can just click your department icon for readable explanations of everything you need to know."

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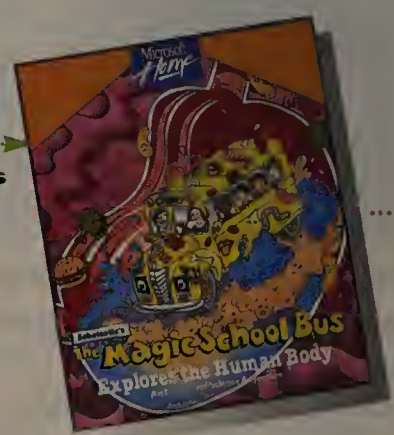

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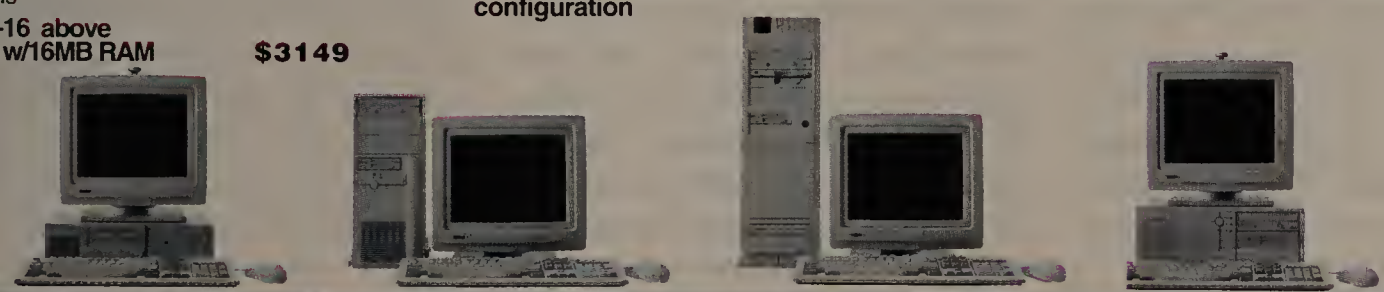

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Merrick Printing: The Font Fandango

Pleasing customers is what business is all about, and that sometimes means running on the same platform—or *platforms*—as your clientele. When family-owned Merrick Printing installed a three-platform desktop publishing department, its clients that had PCs, Macs, and Sun workstations were impressed. But training employees, untangling files, and reformatting fonts turned out to be trickier than anyone had anticipated.

And Merrick Printing is no slouch when it comes to technology: This Louisville-based printing company prides itself on being one of the most sophisticated technical operations in Kentucky. With its array of 35 PCs, 12 Macs, and 1 Sun workstation, Merrick annually produces $12 million worth of brochures, catalogs, manuals, and other printed material. Clients, which include General Electric and Kentucky Fried Chicken, bring in for printing material developed on their own PC-, Mac- or UNIX-based desktop publishing systems.

Problem: No easy Macintosh equivalents for Windows fonts.

Solution: Use PANOSE, built into CorelDraw and PageMaker, to replace fonts across a document.

"The bad news is that PANOSE isn't a standalone product; it only works in programs where it's built in."

Production often requires transferring and reformatting files across platforms.

Initially, it was tough for Merrick to find desktop publishing pros who could work on PCs as well as Macs. "People would say, 'Why on earth would you want to use a PC? Who wants to mess with CONFIG.SYS?'" remembers Matthew Merrick, head of technical operations. Even when he found graphic artists who were willing to learn, the training effort—a combination of video-based classes, computer-based training, and a buddy system—was both laborious and expensive. It cost up to $5000 over nine months to train a desktop publishing specialist to manage fonts, print to a Linotype imagesetter, and do other tasks on a PC.

To keep training costs down and simplify other problems, Matthew Merrick attempted to standardize with software that ran on both Macs and PCs, such as Microsoft Word and Aldus PageMaker. But programs aren't always alike across platforms. Like Graham at Glaxo, Merrick found that Word 6.0 for Windows ran rings around the current Mac release. But he sees hope on the horizon. As a beta tester for Word 6.0 for the Mac, he finds the upcoming release much closer to the Windows version. The releases of PageMaker 5.0 and QuarkXPress 3.3 for Windows have also helped diminish some of the anti-PC bias—as well as the knowledge gap—of the Macintosh world. "It's still difficult, but at least now people are willing to learn the PC," Merrick says.

Font handling poses an even bigger problem. Like most professional publishers,

The PC With Two Brains: Running Two Platforms in One Computer

Ever try stuffing two incompatible computers into a single box? This hair-raising scenario may be your best solution when you need software that's not available on the PC, and you also want to run the same word processor and E-mail as everyone else. But be forewarned: Combo computers often resemble the matinee monsters of our youth—slow, ill-mannered, and totally unpredictable.

Braving Heresy: Bridging the Mac-PC Gap

Want to turn your Mac into a PC? Orange Micro's OrangePC, which plugs into a Mac's NuBus slot and is a PC unto itself, comes with an Intel 486 CPU (ranging from a 486SX-33 to a DX4-100), a 128K secondary cache, up to 64MB of RAM, a PCMCIA Type II slot, and serial and parallel ports. Apple has sold products like this in the past, but for now the OrangePC is the one hardware path to a Mac with a split personality. Our sibling publication *Macworld* tested the OrangePC (*Reviews*, October 1993), and found it not great but usable. • *OrangePC $1139 to $3237; Orange Micro, Inc.; 714/779-2772.* Reader service no. 686

On the other hand, when we tested NuTek Corporation's Duet, a 486DX PC with a Mac semiclone built in, it proved as ornery as the worst two-headed transplant ("Top 20 PCs: More for Less," March 1994). It was unexceptional as a PC, and frequently crashed when running Mac software—a result of NuTek's less-than-perfect Mac emulation. • *Duet 486DX2/66 $3195; NuTek Corp.; 800/900-3838.* Reader service no. 687

If you're on a lower budget, there's Insignia Solutions' SoftPC, a program that tricks DOS and Windows into thinking that a Mac is really a PC. But this emulator can drain the performance of an 80-MHz Power Mac to that of a pale, 25-MHz 486SX. And the effect on a 68040-based Quadra is downright vampiric, slowing DOS-based performance to a crawl. For now, SoftPC only emulates a 286; a 486 version is expected by year's end. • *SoftPC $499; Insignia Solutions; 800/848-7677.* Reader service no. 688

Bringing the Sun Down to Earth

Need to turn a PC into a Sun workstation? Opus Systems' SparCard 5 is a three-board system that does just that. Occupying two adjacent ISA expansion slots, the SparCard 5 packs a 70- or 85-MHz microSparc II CPU, up to 128MB of RAM, I/O interfaces for assorted buses and ports, and the Solaris operating system, all licensed from Sun Microsystems. You'll need a separate hard disk for the Solaris operating system. • *SparCard 5 $2495 and up; Opus Systems; 408/562-9340.* Reader service no. 689

As on the Mac, Insignia Solutions' SoftPC will emulate a 286 on a Sun workstation—again with a considerable performance hit. If you'd rather sacrifice compatibility than speed, there's Wabi, a free upgrade to Solaris that sits between Windows applications and UNIX—much as a spirit medium links the worlds of the living and the dead. Wabi recognizes standard Windows calls and turns them into UNIX code. But like the medium, Wabi's connection isn't perfect. Sun currently guarantees compatibility with 13 major Windows applications, and the forthcoming Wabi 2.0 promises more. But Wabi won't handle DOS applications at all. • *Wabi 1.0; SunSoft; 800/247-3532.* Reader service no. 690

PATRICK PFISTER

MATCHING FONTS ACROSS PLATFORMS is the job of Matthew Merrick and his associates.

Merrick uses PostScript fonts. But Windows comes with built-in support for a competing font standard, called TrueType. And despite conventional wisdom, fonts do vary from platform to platform.

Many of Merrick's customers submit documents in TrueType fonts, which the company's employees then convert to PostScript. In addition, customers often provide text produced in a PC-based program and graphics created on a Mac. To produce a workable composite, Merrick's employees must often resort to saving PC files in ASCII format, importing them to the Mac, and then reformatting them.

Problem: Mac users resistant to learning to use PCs.

Solution: Find applications that work much the same way on both platforms.

"Now people are willing to learn the PC."

Converting fonts, however, is a sticky wicket. For one thing, a font has different names on the PC and the Mac. Fonts are files, and the Mac's long file names allow for more descriptive labels than do the eight-dot-three limitations of DOS. What's more, according to Merrick, "Fonts on the Macintosh are clearly spelled out, such as '45 Helvetica Light Italic'. But on the PC, you have to pick the basic font family from a list of typefaces, and then apply Italic in order to see the style on screen."

Things can get really complicated when the client wants a font that's difficult to identify. "Try finding an equivalent for Berthold Akzidenz Grotesk Bold Italic," Merrick laughs. And kerning differences between Mac and PC PostScript fonts can force the desktop publishers to squeeze letters together to fit copy on a page.

Despite the difficulties of font conversion, Merrick has his fingers crossed that PANOSE, a new type classification system by ElseWare Corporation, will do the trick. PANOSE, which Corel and Aldus have integrated into their CorelDraw and PageMaker programs, helps you substitute fonts when you import a file from another platform. For example, if you transfer a PageMaker file from the PC to the Mac, PANOSE may alert you that a font doesn't exist on the Mac, then suggest a substitute. You can accept the suggestion or pick another font from PANOSE's database. PANOSE will then replace the original font with the look-alike. However, "PANOSE isn't a stand-alone product; it only works in programs where it's built in."

To further eliminate font differences and guarantee that the correct PostScript font will be on hand, Merrick has purchased the Adobe Font Folio, a CD-ROM containing the entire 1800-font Adobe type library for both Macintoshes and PCs. Merrick hopes that the investment, though hefty (the list price is $14,000), will eliminate the need to purchase fonts individually and help shorten production time.

And what about that lonely Sun workstation? "The Sun is still the odd man out," says Merrick. The PCs and Macs all run fine off the Windows NT Advanced Server network, but "we have to use sneaker net to transfer UNIX files. I've hired people for $150 an hour to come in and figure out how to link the Sun to the network, but they just sit there and pore over manuals."

The Nature of the Beasts

The problem, to say the least, seems formidable. It's likely to be a cold day on Venus before computers of different dispositions can share files and formats easily.

Fortunately, vendors from Apple to Z-Code are tripping all over themselves to overcome the kinds of hurdles experienced by the SFWMD, Glaxo, and Merrick Printing—because there's money in the bank for whoever finds a truly workable and hassle-free solution. Until then, multiplatform offices must rely on their own ingenuity—fortunately, a little of that can go a long way.

Bronwyn Fryer is a contributing editor and Michael Desmond an assistant editor for PC World.

WHERE TO BUY

Adobe Acrobat 2.0
List price: $195
Acrobat Pro 2.0
List price: $595
Adobe Systems, Inc.
800/833-6687
Reader service no. 660

Adobe Font Folio
List price: $14,000
Aldus PageMaker 5.0
List price: $895
Aldus Corp.
800/333-2538
Reader service no.661

Lotus cc:Mail
List price: 10 users $590
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List price: $339
Lotus Development Corp.
800/343-5414
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Microsoft Word 6.0
List price: $339
Microsoft Windows NT Advanced Server
List price: $999
Microsoft Corp.
800/426-9400
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QuarkXPress 3.3
List price: $895
Quark Inc.
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WordPerfect 6.0
List price: $495
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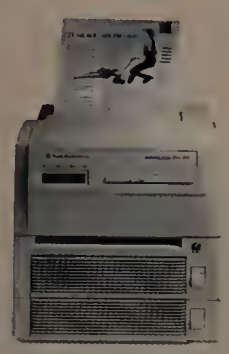

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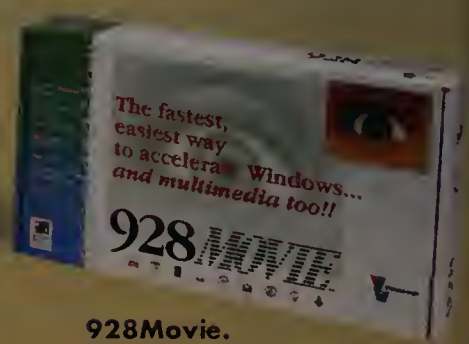

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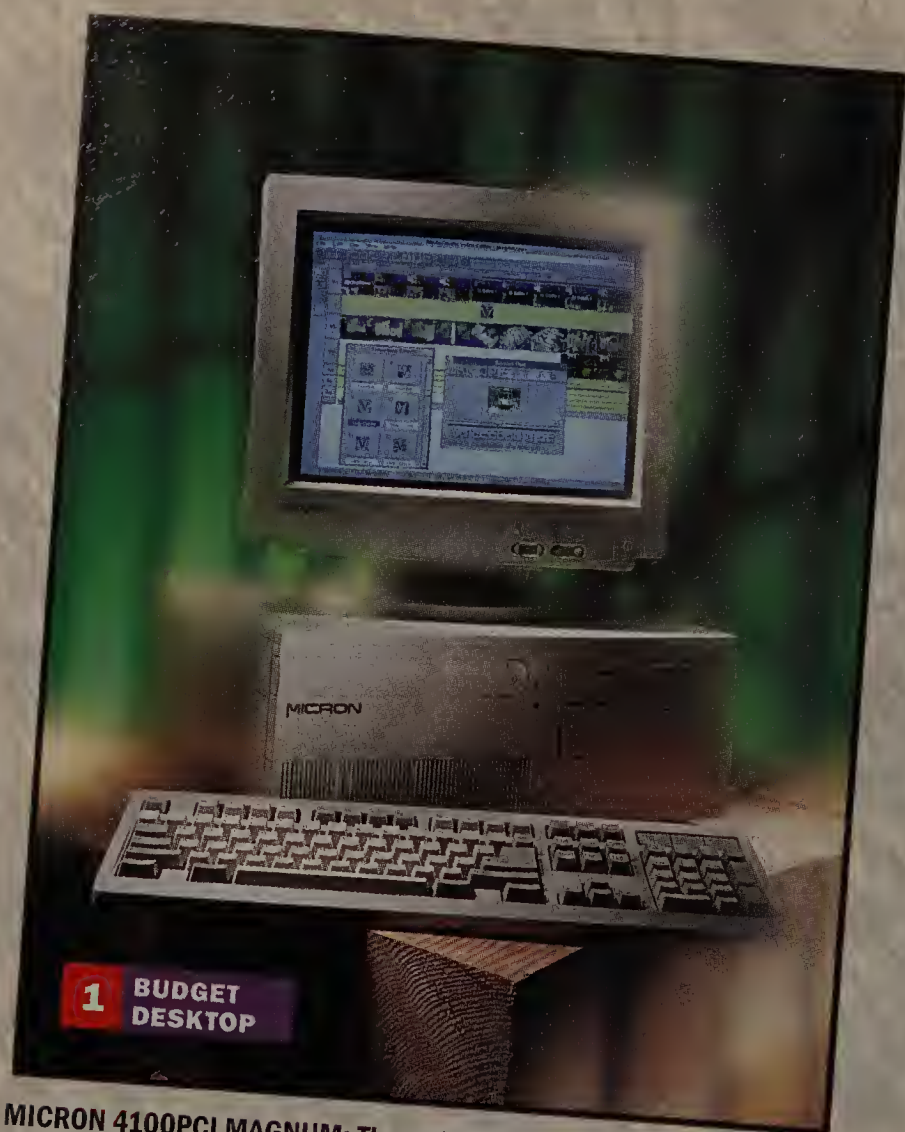
TOP 20 PCs

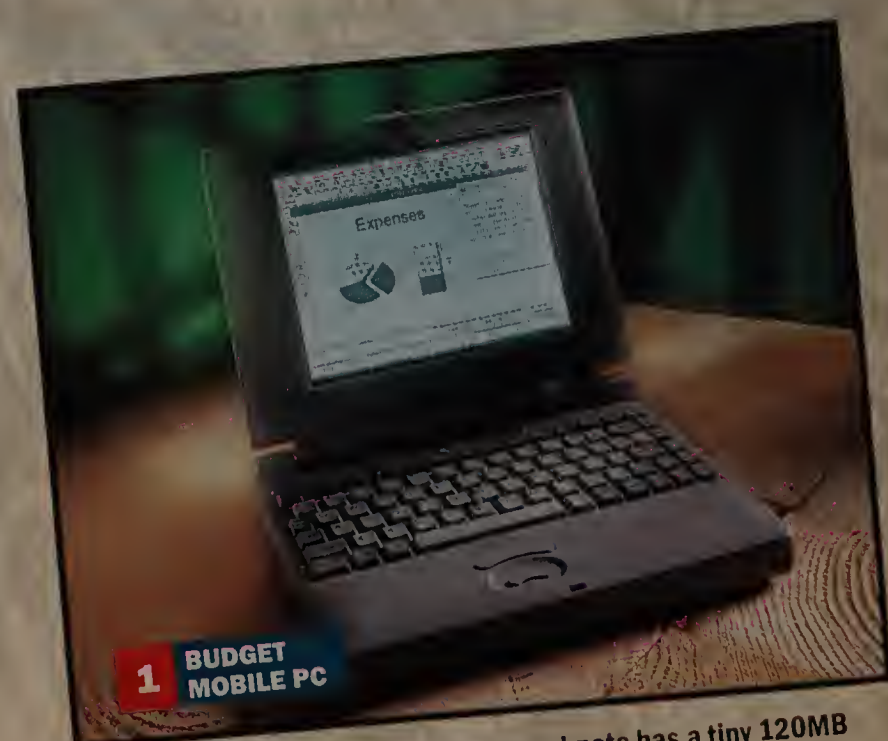
POWER SYSTEMS, BUDGET PRICES



MICRON 4100PCI MAGNUM: Three-time budget desktop number one costs just $2099 and provides maximum bang for the buck.

An all-star lineup of new budget PCs dominates this month's Top 20 charts. At the top of the charts: Dell Dimension XPS P90, Micron 4100PCI Magnum, Compaq LTE Elite, and Toshiba Portégé T3400

This Month's Contenders pg. 225 Power Desktops pg. 226
Budget Desktops pg. 236 Mobile PCs pg. 246



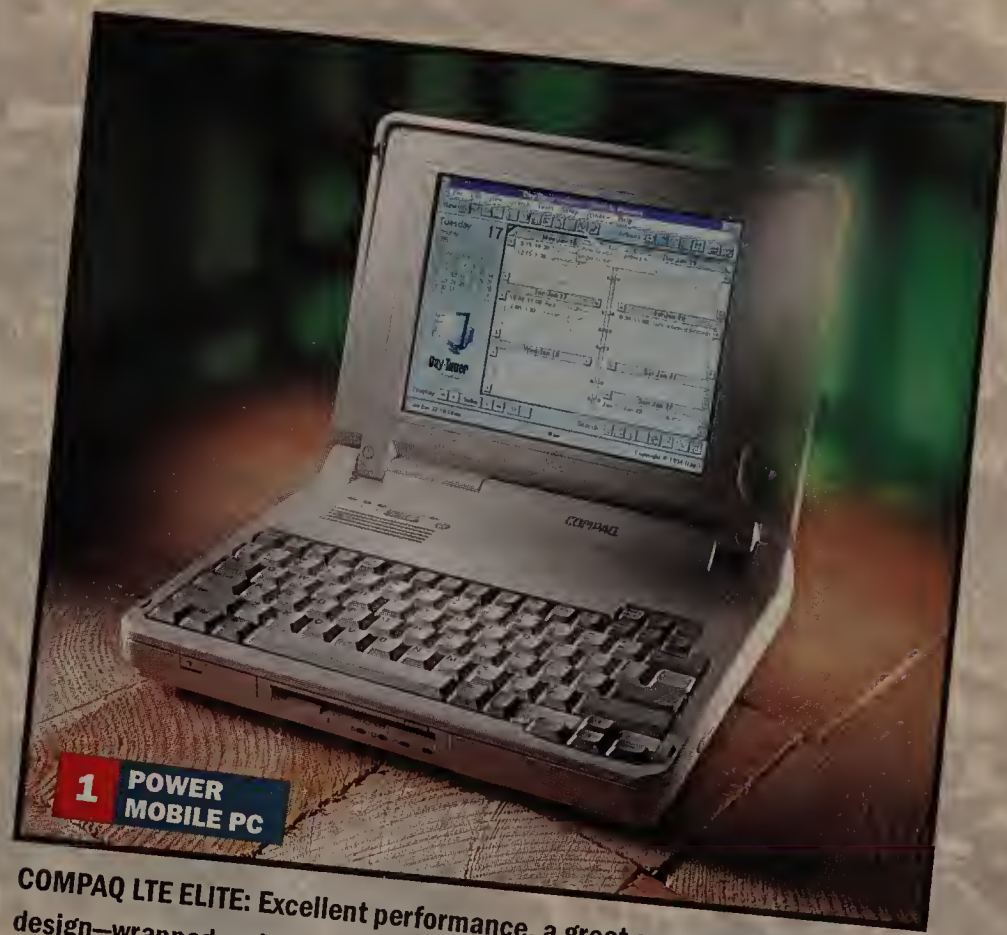
TOSHIBA PORTÉGÉ T3400: This mono subnote has a tiny 120MB hard drive. But for just $1299, you get 6.5 hours of battery life.

The word *budget* generally evokes images of penny-pinching and hard compromises. But this month's batch of budget desktops takes the torture out of low-cost purchases. Consider that the Micron 4100PCI Magnum—priced at $3000—was a Best Buy power desktop PC in June. Now this fast DX4-100 costs just $2099 and is our number one budget desktop Best Buy. In addition to this veteran top gun, eight new machines—priced as low as $1539—also stake a claim on this month's Budget Desktops Top 20. And four of these contenders nail down Best Buys in the bargain.

But what if you want top performance? Usually the shift from power to budget desktops brings a big drop-off in performance. While this performance differential is still noticeable, it's a pleasant surprise to see how much faster low-cost systems are now getting the job done.

BY REX FARRANCE

TESTING BY DEAN ANDREWS, DAVE CASINI, ULRIKE DIEHLMANN, AND SUSAN SILVIUS; RESEARCH AND SUPPORT BY MIKE SALAYKO



COMPAQ LTE ELITE: Excellent performance, a great screen, and superior design—wrapped up in a portable packaged for power users.

DELL DIMENSION XPS P90: Would you believe six months as power desktop number one? This quick Pentium-90 super PC has a 1080MB hard drive.

For example, this month's number five budget Best Buy, the EPS P-60 Phantom—a Pentium-60 with a robust configuration reminiscent of a power desktop PC—reaches performance levels close to those of quick Pentium-90s.

And the Phantom's not alone in its high-flown status. Powerful processors abound: 10 Pentiums—including 2 Pentium-66s—and a DX4-100 are represented in the Budget Desktops Top 20. Storage configurations grow ever healthier: 11 Top 20 budget desktops now offer 500MB or larger hard drives. And 3 Budget Top 20 PCs feature a robust 16MB of RAM, which was previously a power desktop exclusive.

1994's Top Ten Systems

This year Pentium-60 prices plunged from around $5000 to below $2500, and loaded Pentium-90s now commonly sell for less than $3500. Here are 1994's top 10 achievers from our Top 20s, listed alphabetically by vendor.

ALR Evolution V. Pentium-60, -66, and -90 models. Showed 17 times on our Power Desktops Top 20, with Best Buys four straight months starting in February.

Austin Pentium PCs. Members of Austin's series of Pentium PCs—the Power System 60, the P5-66, and the P-90—have appeared on the Top 20s a total of 17 times, with five Best Buys.

Compaq LTE Elite. The quintessential power notebook: a fast, light, active-matrix color DX4-75 with great battery life. Best Buy since October.

Dell Dimension XPS P90. Pentium-90, great price, 1080MB hard drive. Number one power desktop Best Buy for last six months!

Gateway P5. Price/performance Pentium-60, -66, and -90 systems made 24 appearances on Power and Budget Desktops Top 20s since May, with eight Best Buys.

IBM ThinkPad 750. Versatile IBM series earned a power mobile Best Buy twice for the active-matrix color unit and once for the monochrome pen-based version. Now replaced by ThinkPad 755s and 760s (look for reviews of 755s and 760s soon).

IBM ValuePoint P/60D First-ever Best Buy Pentium-60 in January. Six straight months' Best Buy billing, ten months on Power Desktops Top 20. IBM's Personal Computer 300 P-60 will ultimately succeed this sterling performer.

Micron 4100PCI Magnum. First DX4-100 budget Best Buy. Snappy performer captured power desktop Best Buys in June and July; budget Best Buy for the last three months.

Micron P90PCI PowerStation. Fast, compact Pentium-90 with colossal 32MB of RAM. On Power Desktops Top 20 since August, with Best Buys for the last three months.

Zeos Pantera. Red-hot models based on DX2-66, DX4-100, and Pentium-60, -66, and -90 CPUs have racked up 14 power and budget desktop Best Buys since June.

New Movements on the Microprocessor Front

We're seeing indications that Intel's hold on the market for Pentium-level microprocessors may be easing. After six years developing its chip, NexGen, a Silicon Valley company, is now releasing a CPU designed to go head-to-head with Intel's Pentium. Unlike the Pentium, the innovative NexGen integrates the secondary cache controller so the controller can run at the same clock speed as the CPU. NexGen reports its 84-MHz Nx586-P90 CPU equals a Pentium-90 in performance but costs less.

NexGen's performance claims appear well founded. The Alaris Nx586 P90, one of the first systems to use the Nx586-P90 chip, ran all our DOS and Windows tests this month without a glitch as quickly as a fast 90-MHz Pentium-based PC. Expect to see other machines bearing NexGen microprocessors in coming months.

Notebook Records Still Falling

Power mobile PCs continue to break records. This month, the Austin Business Audio 4/100 notebook, a DX4-100 system configured with 16MB of RAM, records astounding speed for a notebook, achieving a *PC World* performance rating of 69. Nine of the ten top-rated power mobile PCs have performance ratings above 40, and three of these are above 50—comparable to the performance of a quick DX2-50 desktop. This showing points to a major improvement in current notebooks—and indicates that mobile PC units are finally delivering on their early promise.

At the same time, battery life has skyrocketed, thanks to power-conserving CPUs and better power management. This month, for example, the Compaq LTE Elite 4/40CX Model 170 turns in an incredible 8.5 hours of off-the-plug performance.

At year's end, it's useful to note the top achievers from 1994's Top 20 charts. Check "1994's Top Ten Systems" on this page, and keep an eye on these PCs and their successors in 1995.

Rex Farrance is an associate editor for PC World. *He can be reached on PC World Online (see page 12 for contact information).* PC World *staff members Mike Desmond, John Goddard, Anita Hamilton, Owen Linderholm, Melissa Riofrio, and Susan Silvius contributed to this article.*

Call 800/434-4495 and use the fax reprint numbers listed in the Top 20 tables to order fax copies of system reviews. You may order three systems' capsule reviews for $4.95; a single capsule review plus features table and test report for $4.95; an entire month's review for $9.95 (December 1993, 3012; January 3001; February 3002; March 3003; April 3004; May 3005; June 3006; July 3007; August 3008; September 3009; October 3010; November 3011; December 1994, 3913); and a list of all systems tested by the PC World Test Center for the Top 20s reports for $4.95. Touch-tone telephone required. Payment by Visa or MasterCard.

For more information about all products in this article, circle reader service no. 901.

This Month's Contenders

Our look at this month's contenders for the Top 20 Power and Budget Desktops and the Top 20 Mobile PCs. Icons show where systems placed on the Top 20 charts.

Acma P90

PROS: Strong performance, lots of expansion options
CONS: No weekend tech support

The Acma P90 is another solid offering from this Fremont, California, system maker. It turned in strong 90-MHz Pentium scores and has a solid configuration, including 8MB of RAM, 256K of secondary cache, and a 420MB hard drive. The 1MB 64-bit PCI graphics accelerator matches up nicely with the 15-inch monitor. The $2600 price is reasonable for a solid, basic power desktop.

Acma

This massive, spacious tower PC has oodles of expansion options. You get one PCI slot, one PCI or 16-bit slot, and three 16-bit slots free, along with an impressive complement of six unoccupied drive bays (two externally accessible). A seventh drive bay holds a stacked PCMCIA slot that can support a Type II and a Type III peripheral at the same time. The PCMCIA slot provides flexibility for notebook users who want to swap peripherals. (Acma claims the unit supports PCMCIA hot-swapping of cards without shutting down.) The secondary cache is maxed out, but system RAM expands to 128MB.

Acma's 45-day money-back guarantee and year of free on-site service are great, but the one-year warranty is nothing special, and there's no weekend tech support. But these are relatively minor complaints about a reasonably priced offering from a reputable company. *Acma Computers, 800/786-6888* **Reader service no. 741**

Alaris Nx586 P90

PROS: Excellent performance, 16MB caching disk controller
CONS: No weekend tech support, 14-inch monitor

Alaris is the first manufacturer to bring us a system driven by one of the new NexGen microprocessors designed to compete with Intel's Pentiums. The Alaris Nx586 P90 uses NexGen's 84-MHz Nx586-P90 CPU. This processor is less expensive than the Pentium-90 and ran all the DOS and Windows apps in our testing benchmarks flawlessly—at speeds rivaling those of a Pentium-90. In fact, the few Pentium-90s with faster test times surpassed the Alaris by just an eye blink. Unlike the Pentium, the innovative NexGen microprocessor integrates the secondary-cache controller so the controller can run at the same clock speed as the CPU. Keep in mind that the NexGen processor is not pin compatible with any of the Pentiums and does not integrate a math coprocessor. Users of coprocessor-dependent applications such as CAD should take caution. NexGen promises a version with an integrated math coprocessor in the first half of the new year.

Alaris delivered our review unit with 16MB of RAM, 256K of secondary cache, a 540MB IDE hard drive, and a VL bus hard drive controller with a mammoth 16MB cache on board. A disk cache this big constitutes overkill for business applications, boosting cost much more than it does performance. The resulting $4059 price—while competitive with prices of comparable Pentium-90 super PCs—keeps the Alaris off our Power Desktops Top 20.

Four externally accessible drive bays are free in this compact system. You get four free 16-bit slots—the two VL bus slots are claimed by the 16MB caching drive controller and the 2MB Diamond Stealth 64 graphics accelerator. Alaris provides a good-quality monitor, although it's just a 14-inch model.

Alaris

Alaris's three-year warranty is top-notch, and you can get a year of on-site service for $79. Phone support is available 10 hours a day, but weekdays only. The Alaris Nx586 P90 is a hot package—even if its maxed-out configuration prices it out of range for most business users. As a first offering of a brand-new microprocessor family, it bodes very well for the new NexGens. *Alaris, 800/317-2348* **Reader service no. 742**

AT&T Globalyst 200 (486SX-33)

PC WORLD TOP 20
6 BUDGET MOBILE PC

PROS: Wonderful design, good power management
CONS: Smallish hard drive

We always laud AT&T for its fine notebook design, and this low-cost Globalyst did nothing to change our opinion. This unit is virtually identical to the Globalyst 200 (486SX-33) reviewed in September. It has 8MB of RAM (20MB max), however, and its performance is quick for a 486SX-33 and nearly 50 percent faster than the 4MB version reviewed previously. As with all Globalysts, the casing has an incredibly solid feel, the port covers are tough and won't snap off easily, and even the system's distinctive appearance sets the unit apart from run-of-the-mill budget notebooks. This model is positioned at the low end of the Globalyst line, but the 9.4-inch dual-scan color display is a decent budget compromise. The 170MB hard drive, however, is on the small side. AT&T provides both a PCMCIA Type III slot and a Type II slot.

AT&T Globalyst (486SX-33)

AT&T loads this notebook with communications software, including a mail package and remote and standard fax software. You won't often worry about running short of power with this unit: The NiMH battery ran a respectable 4.75 hours in our tests.

AT&T's support for its notebooks includes a three-year warranty, a year of free on-site service, 24-hour toll-free phone support, and a 30-day money-back guarantee. That adds up to some of the

THE TOP 20

PC WORLD POWER DESKTOPS

1 Dell Dimension XPS P90
No. 1 for six months running.

➤ New this month ◄ No change from last month
▲ Up from last month ▼ Down from last month

BEST BUYS

		Last month	Months on chart	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Bus slots
1	◄ Dell Dimension XPS P90	1	6	96	93	72/79	$3228	Pentium-90	16	1080	ISA, PCI
2	◄ Zeos Pantera DX4-100	2	3	94	95	68/75	$2845	DX4-100	16	530	ISA, PCI
3	▲ Austin P90	9	3	92	106	68/76	$4237	Pentium-90	16	1060	ISA, PCI
4	▲ Micron P90PCI PowerStation	5	5	92	98	69/82	$3359	Pentium-90	32	540	ISA, PCI
5	▼ Quantex QP5/90B-2	3	2	92	96	69/77	$3224	Pentium-90	16	540	ISA, PCI
6	➤ EPS P-60 Phantom	–	1	92	95	64/70	$2295	Pentium-60	16	540	ISA, PCI
7	▼ Zeos Pantera 90	4	5	91	102	68/75	$3409	Pentium-90	16	530	ISA, PCI
8	▼ Gateway P5-60	6	3	91	80	69/72	$2459	Pentium-60	8	540	ISA, PCI
9	➤ Zeos Pantera 60	–	1	91	84	68/75	$2295	Pentium-60	8	530	ISA, PCI
10	▼ Dell OptiPlex 590	7	2	91	98	72/79	$3699	Pentium-90	16	540	ISA, PCI
11	▼ Austin P5-66	8	4	90	94	68/76	$3158	Pentium-66	16	525	ISA, PCI
12	➤ Quantex QP5/60W-2	–	1	90	80	69/77	$2349	Pentium-60	16	540	ISA, PCI
13	◄ Netis 566	13	2	89	90	64/68	$2225	Pentium-66	8	540	ISA, PCI
14	▼ EPS P-90 Explorer	10	2	89	102	64/70	$2995	Pentium-90	16	540	ISA, PCI
15	▼ ALR Evolution V ST/90	11	3	89	99	73/74	$3950	Pentium-90	16	540	ISA, PCI
16	➤ Gateway P5-60 Family PC	–	1	89	77	69/72	$2499	Pentium-60	8	730	ISA, PCI
17	▼ Zeos Pantera 66	14	7	89	89	68/75	$2990	Pentium-66	16	530	ISA, PCI
18	▼ Polywell 586-90VIP	15	5	89	99	64/70	$3122	Pentium-90	16	540	ISA, PCI
19	➤ Zenon Z-Titan Pentium 66	–	1	89	99	64/67	$2699	Pentium-66	16	540	ISA, PCI
20	▼ Polywell Poly 586-66V1	12	3	89	93	64/70	$2395	Pentium-66	8	420	ISA, VLB

[1] Call 800/434-4495 and use the fax reprint numbers listed in the table to order fax copies of system reviews. You may order three systems' capsule reviews for $4.95;a single capsule review plus features table and test report for $4.95; an entire month's review for $9.95 (June 3006, July 3007, August 3008, September 3009, October 3010, November 3011, December

2 Zeos Pantera DX4-100
DX4-100 runs like a Pentium-90.

3 Austin P90
Fast; big hard drive, monitor

4 Micron P90PCI
Fine price; 32MB of RAM.

5 Quantex QP5/90B-2
$3224 with 17-inch monitor.

Monitor size/ dot pitch	Vendor contact number	Issue reviewed	Fax reprint number [1]	Reader service no.	Comments
15"/.28	800/289-3355	July 94	3113	774	Top-notch mix of power, features, and price is a six-time no. 1.
15"/.28	800/554-5220	Oct 94	3140	775	Top-rated DX4-100 runs with the Pentium-90s but costs less.
17"/.28	800/752-1577	Oct 94	3142	776	Fastest system on Power Top 20, with huge hard disk and monitor.
15"/.28	800/438-3343	Aug 94	3124	777	Compact desktop with tons of RAM holds on to Best Buy status.
17"/.28	800/288-0566	Nov 94	3152	788	Loaded with multimedia features and priced to sell.
15"/.28	800/447-0921	current	3162	749	Budget Best Buy Pentium-60 matches the performance and configuration of many Pentium-90s.
15"/.28	800/554-5220	Aug 94	3123	778	One of the fastest systems we've tested, at a very good price.
15"/.28	800/846-2000	Oct 94	3144	779	Also on Budget Top 20. Configured with optional 64-bit ATI PCI graphics card at this price.
14"/.28	800/554-5220	current	3163	759	Fine budget Best Buy. Buy it with a 15-inch monitor for $95 extra.
14"/.28	800/289-3355	Nov 94	3162	780	Sibling of no. 1 power system is quicker and more expensive.
15"/.28	800/752-1577	Sept 94	3132	781	Pentium-66 is faster than several 90s and full of features.
15"/.28	800/288-0566	current	3164	753	Configured to make a great home-office PC. Also on Budget Top 20.
15"/.28	800/577-7526	Nov 94	3154	782	Basic budget-priced Pentium-66 is a very good performer. Also on Budget Top 20.
14"/.28	800/447-0921	Nov 94	3153	783	Fast, and the cheapest Pentium-90 on Power Top 20.
15"/.28	800/444-4257	Oct 94	3145	784	Very fast. ALR has the best reliability rating on the Power Top 20.
15"/.28	800/846-2000	current	3165	750	Fax-modem, multimedia bells and whistles. Terrific home PC.
15"/.28	800/554-5220	June 94	3091	785	Tower model with solid power configuration.
15"/.28	800/999-1278	Aug 94	3126	786	Quick, well-priced system with a solid configuration.
15"/.28	800/899-6119	current	3166	758	When it comes to performance, this system is hot, hot, hot! Solidly set up and well designed.
15"/.28	800/999-1278	Oct 94	3146	787	Quick, budget no-frills system has excellent performance. Also makes Budget Top 20.

3913); and a list of all systems tested by the PC World Test Center for the Top 20s for $4.95. Touch-tone phone required. Payment by Visa or MasterCard.

For more information about all products in this table, circle reader service no. 902.

top mobile PC support in the industry. Furthermore, the $2710 price is attractive for a 33-MHz budget notebook with sparkling performance and good battery life. This Globalyst is an improvement over the 4MB machine previously reviewed, and it replaces that model on our Budget Mobile PCs chart. *AT&T Global Information Solutions, 800/637-2600, 513/445-5000* **Reader service no. 743**

AT&T Globalyst 200 (DX4-75)

PROS: Great performance, brilliant color screen, excellent support policies
CONS: Relatively short battery life

The AT&T Globalyst 200 (DX4-75) notebook will be attractive to business travelers. Sleek design, a beautiful 9.5-inch active-matrix color screen, a smooth-gliding trackball, and a well-planned keyboard attest to its overall quality. A 1MB local bus graphics accelerator supports 1024 by 768 displays on external monitors.

You expect quickness from a mobile DX4-75, but this model is particularly fast. With 8MB of RAM, it breezed by all but the fastest power notebooks. The sturdy 7.6-pound unit features a 250MB hard drive, which is removable but not currently upgradable. The PCMCIA slots will accept a Type II and a Type III device at the same time. AT&T sells an optional docking station as well as a variety of PCMCIA devices. And AT&T Mail Access Plus and BitFax come preinstalled—whether or not you purchase the unit with a modem. You can access limited power management settings in Windows or more extensive choices in setup. You can also put the Globalyst in rest mode via a keystroke and then hot-swap batteries without losing data. The AC adapter is small and light.

AT&T Globalyst (DX4-75)

AT&T's three-year warranty, 30-day money-back guarantee, 24-hour toll-free technical support, and year of free on-site service are among the finest notebook support policies available. And the $4530 price isn't bad for a fast, classy color notebook. So what nudges this excellent unit off our Power Mobile PCs chart? A so-so battery life of just under 3 hours. But if your computing habits leave you time to recharge between unplugged sessions, the Globalyst's performance and knockout screen make it worth checking out. *AT&T Global Information Solutions, 800/637-2600, 513/445-5000* **Reader service no. 744**

Austin Business Audio 4/100

PC WORLD TOP 20 6 POWER MOBILE PC

PROS: Explosive performance, large hard drive, built-in sound, fast fax-modem
CONS: Muted colors on active-matrix color screen

Austin's $4799 Business Audio 4/100 flashed through our performance tests like no other notebook we've seen. In fact, its performance scores compare favorably with those of a very fast DX2-66 desktop unit and noticeably surpass those of all the DX4-100 and Pentium notebooks we've tested. What's the secret to Austin's success? The potent DX4-100 processor along with the sizable 16MB of RAM are pivotal, but Austin says that the local bus graphics and drive adapters and the customized BIOS are the factors that really push this system to the forefront.

The local bus adapter hooks up to a generous 525MB removable hard drive, and if that's not big enough, Austin offers a 700MB model. The Business Audio 4/100's built-in 16-bit sound should do a great job of livening up presentations. No microphone or speakers are included, but Austin will provide them for just $24. The 9.4-inch active-matrix color screen, powered by a 1MB local bus graphics accelerator, can display 256 colors on an external monitor—even at 1024 by 768 resolution. But the screen colors on our review unit appeared muted.

Austin

The system weighs in at a slightly hefty 8.4 pounds, but the keyboard is nicely laid out, and the marble–size trackball is comfortable. You can open the unit's lid nearly a full 180 degrees, but the smooth gray casing doesn't feel as sturdy as we'd like. We got 3 hours of battery life with the handful of power management settings enabled—not bad for a powerful DX4-100.

This unit also comes with a fast 14.4-kbps fax-modem, Windows fax software, and Microsoft Works for Windows. The stacked PCMCIA Type III slot can alternatively accept two Type II cards. The company's 24-hour tech support and 30-day money-back guarantee are pluses, although the one-year warranty is run-of-the-mill. This unit stacks up solidly on our Power Mobile PCs chart, and if performance is your top concern, look no further. *Austin Direct, 800/752-1577, 512/339-3500* **Reader service no. 745**

Compaq LTE Elite 4/40CX Model 170

PC WORLD TOP 20 7 POWER MOBILE PC

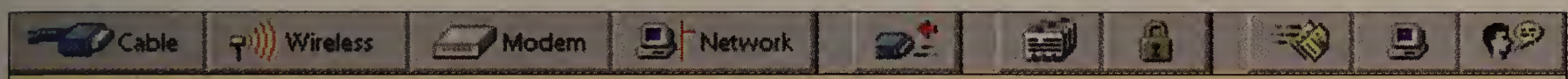
PROS: Record-breaking 8.5-hour battery life, innovative design and usability features, super service and reliability
CONS: Pricey, standard hard drive is on the small side

Compaq's LTE Elite line makes strides in notebook design and usability. Most impressive with the 4/40CX is the unit's 8.5-hour battery life—the longest we've seen. Performance—while nowhere near state-of-the-art—is solid: This DX2-40 with 8MB of RAM can keep pace with typical DX2-50 notebooks.

The LTE Elite's 1MB local bus video contributes to its strong showing. Hook the unit up to an external monitor or LCD panel, and you can display 1024 by 768 video at 256 colors. And travelers will appreciate Compaq's slick design, which integrates the AC adapter into the 7.2-pound notebook; the thin power cord remains the only tag-along accessory. If the standard 170MB removable hard drive boxes you in, 340MB and 510MB drives are optional.

Compaq has invested a lot in providing true Plug and Play; autoconfiguration; and hot-swapping for PCMCIA peripherals. Although the company recalled some DX2-50 and DX4-75 LTE Elites earlier this year due to PCMCIA slot malfunctions, it says those problems are now corrected. In our limited tests, hot-swapping of cards worked fine using the PCMCIA Type III slot.

We do wish the 8.4-inch active-matrix color screen were a bit larger. But the keys are laid out nicely and have the short travel



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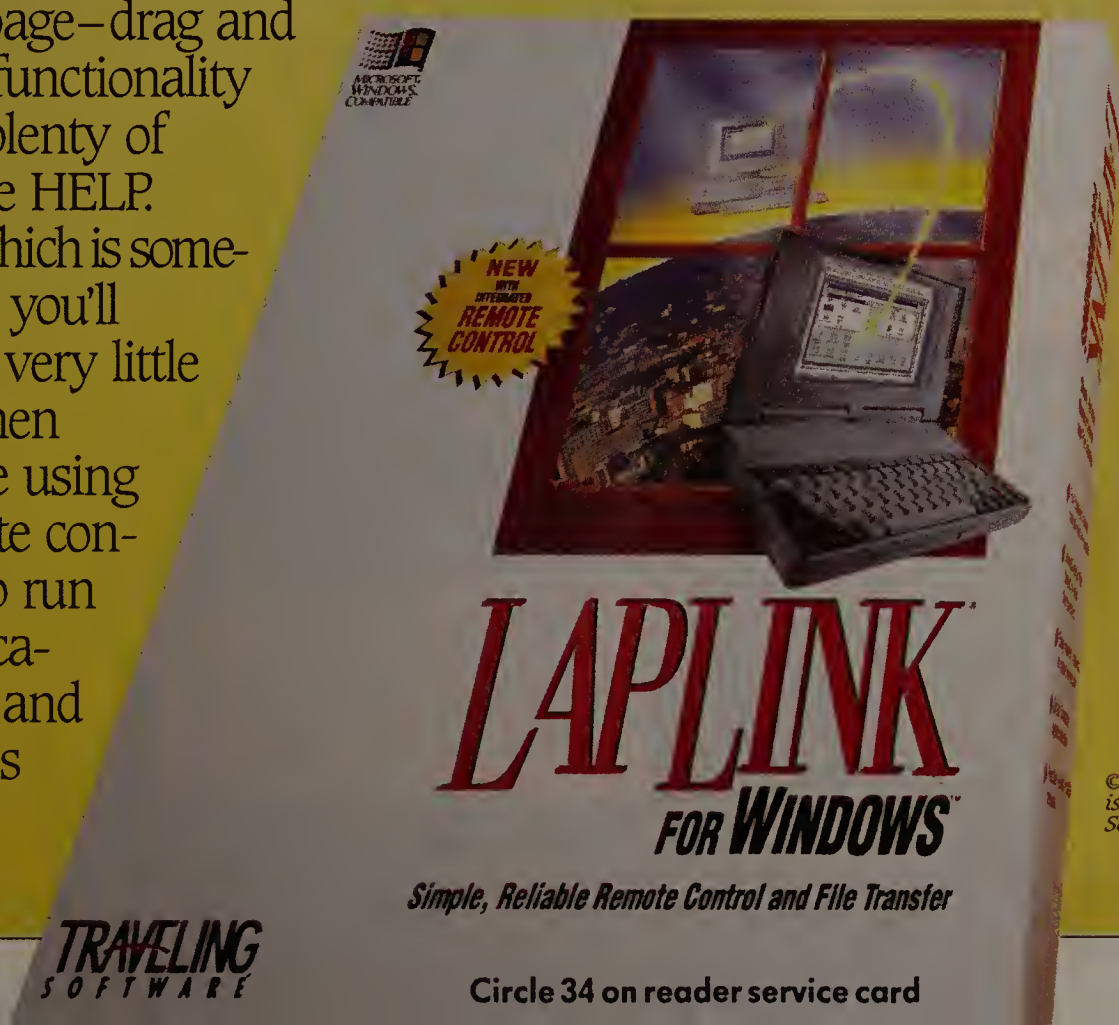

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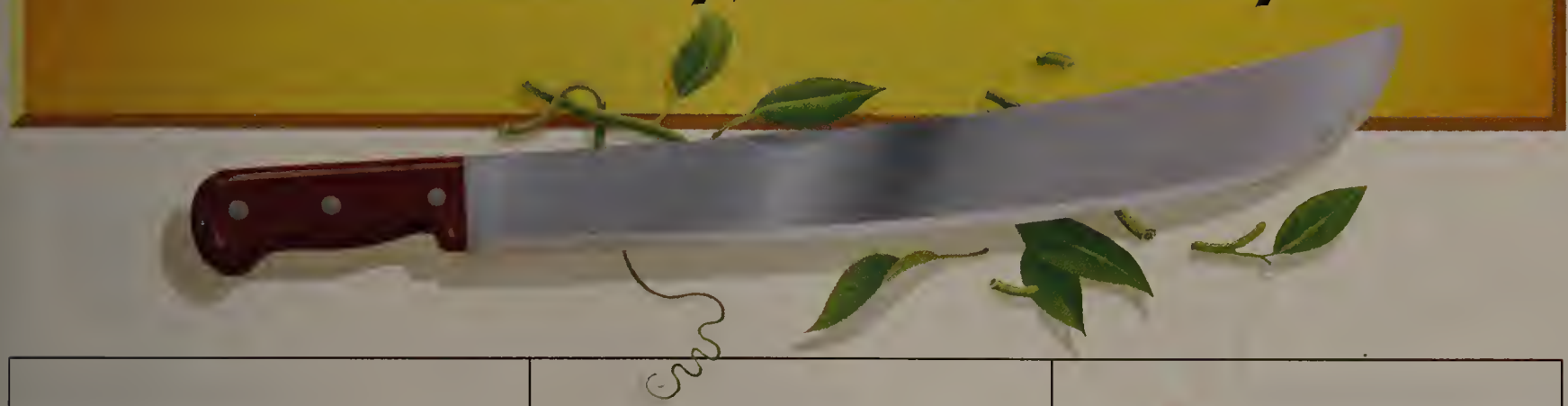

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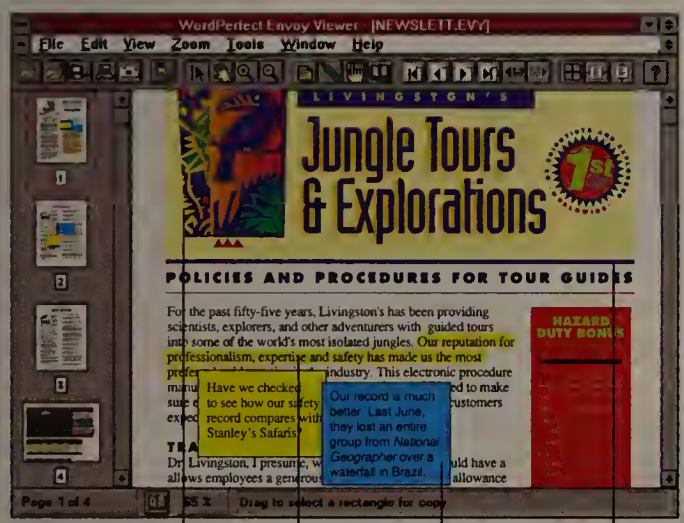

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and stiff feel characteristic of Compaq notebooks. A small trackball is located on the lower right side of the display panel, comfortable for right-handed users but bad news for lefties.

Compaq preloads a runtime version of Microsoft Video for Windows, TabWorks, and a suite of helpful utilities. The online help is outstanding. Options include three docking stations, an external SCSI adapter, and PCMCIA fax-modems.

Compaq

Compaq's three-year warranty and 24-hour toll-free technical support are among the tops in the industry. In many respects, the LTE Elite 4/40CX is a leader. So why no appearance on the Power Mobile PCs chart? Well, the $4254 price is pretty steep, considering that it buys you only a 170MB hard drive and less than top performance. Still, the unit's amazing battery life, long warranty, and other impressive attributes earn it our hearty recommendation. *Compaq Computer, 800/345-1518* **Reader service no. 746**

CompuAdd CP60p

PC WORLD TOP 20 14 BUDGET DESKTOP

PROS: Low price, good documentation, fax-modem **CONS:** None

This $2299 system includes features that make it a great choice for a home office: a CD-ROM drive, an internal 9600-bps fax-modem, and a 15-inch monitor. The CP60p enjoys a solid basic Pentium configuration, with 8MB of RAM (128MB max), 256K of secondary cache, and a 425MB hard drive, and it's a good Pentium-60 performer. There are four free drive bays (two externally accessible) and two free SIMM sockets; and one PCI, one PCI or 16-bit, and two 16-bit slots are also free.

CompuAdd

The 15-inch monitor works very well for Windows, and the 1MB PCI graphics board is adequate for business applications. Overall, the CompuAdd CP60p is an impressive entry-level Pentium system that boasts impressive documentation and decent service and support, including recently upgraded 24-hour toll-free tech support. This system ranks solidly on our Budget Desktops Top 20. *CompuAdd Computer, 800/627-1961* **Reader service no. 747**

CTX EzNote

PC WORLD TOP 20 5 BUDGET MOBILE PC

PROS: Good performance, light weight, long battery life **CONS:** Cramped keyboard, mediocre display, loose screen joint, no weekend tech support

CTX's $2149 EzNote is tailored for those in search of a light, inexpensive, powerful subnote. About the size of a Gideon Bible and featherlight at just 6.8 pounds, the EzNote sports a fast DX2-50 CPU but rivals the performance of a typical DX2-66 notebook. You get 8MB of RAM and a 250MB hard drive. That's not all: The NiMH battery's life is over 5 hours, and a Windows tool determines if PCMCIA cards are compatible for Plug and Play use in the Type III slot. All these good points—along with an attractive vendor-estimated $2149 street price—earn the CTX a spot on our Budget Mobile PCs list.

CTX

Unfortunately, this diminutive notebook has a few design tradeoffs. The cramped keyboard makes for frequent typing errors. A tiny trackball is easy to master, but we often hit it when reaching for the <Space> bar. Our other complaint concerns the 7.8-inch screen: Even after extensive fiddling with the controls on our test unit, we still saw color bands in the darker areas. And it doesn't take much of a bump to tilt the screen out of adjustment.

CTX's warranty covers the basics: You get a one-year warranty, a three-day turnaround policy on factory repairs, and 9-hour weekday tech support. CTX is new to our pages—we can't report a service track record. The EzNote's design takes getting used to, but its low price, high speed, and easy portability make it a likely road companion. *CTX Int'l, 800/888-9052* **Reader service no. 748**

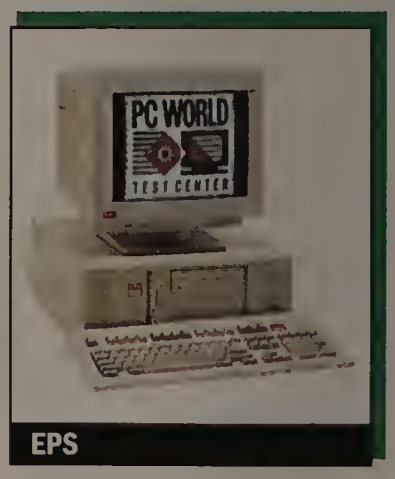
EPS P-60 Phantom

PC WORLD TOP 20 5 BUDGET DESKTOP

6 POWER DESKTOP

PROS: Superb Pentium-60 performance, low price, rock-solid configuration **CONS:** Accepts only one full-length card

To say we were impressed by the performance of EPS's well-built compact P-60 Phantom would be an understatement. With scores more like a typical Pentium-90's, this compact Pentium-60 is *fast*—particularly in the Excel and Paradox for DOS benchmarks. And fantastic performance does not mean a high price. For $2295 you get a solid configuration with 16MB of RAM (192MB max), 256K of secondary cache, a 540MB hard drive, and even a Mitsumi CD-ROM drive. EPS provides a flat 15-inch Hitachi monitor driven by a Diamond Stealth 64 card with 2MB of VRAM. You're probably getting the picture by now: This system earns a Best Buy as a budget PC and barely misses the honor on our Power Desktops chart.



EPS

There are two free externally accessible drive bays, and one 16-bit slot, one PCI slot, and one 16-bit or PCI slot. Accessibility is good, but there's room for just one full-length expansion card.

EPS backs its system with strong support policies, which include a three-year parts warranty (one year on labor), a year of on-site service, a 60-day money-back guarantee, and 12 hours of weekday tech support (6 hours on Saturdays). The amply illustrated documentation is written in plain English. Quality support poli-

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THE TOP 20

PC WORLD

BUDGET DESKTOPS

1 **Micron 4100PCI Magnum**
DX4-100's third month as Best Buy.

New this month · Up from last month · No change from last month · Down from last month

BEST BUYS

		Last month	Months on chart	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Bus slots
1	Micron 4100PCI Magnum	1	3	89	80	69/82	$2099	DX4-100	8	420	ISA, VLB
2	Zeos Pantera DX2-66	–	1	89	70	68/75	$2054	486DX2-66	8	530	ISA, PCI
3	Zeos Pantera 60	–	1	88	84	68/75	$2295	Pentium-60	8	530	ISA, PCI
4	VTech Expo 486DX2-66	–	1	88	59	69/62	$1539	486DX2-66	8	540	ISA, VLB
5	EPS P-60 Phantom	–	1	87	95	64/70	$2295	Pentium-60	16	540	ISA, PCI
6	Intelesys P5-60	–	1	87	74	64/70	$1999	Pentium-60	8	430	ISA, PCI
7	VTech Platinum 486DX2/66 Dual	26	1	87	63	69/62	$1968	486DX2-66	16	500	ISA, VLB
8	Quantex QP5/60W-2	–	1	87	80	69/77	$2349	Pentium-60	16	540	ISA, PCI
9	Diamond DT 486-66	2	4	87	64	65/66	$1650	486DX2-66	8	270	ISA, VLB
10	MIS M466T	7	7	87	59	78/84	$1800	486DX2-66	8	240	ISA, VLB
11	Gateway P4D-66	3	7	87	60	69/72	$2169	486DX2-66	8	730	ISA, PCI
12	Gateway P5-60	4	3	87	80	69/72	$2459	Pentium-60	8	730	ISA, PCI
13	Netis 566	19	2	87	90	64/68	$2225	Pentium-66	8	540	ISA, PCI
14	CompuAdd CP60p	–	1	87	78	70/72	$2299	Pentium-60	8	425	ISA, PCI
15	Micro Express MicroFlex-VL/660	5	2	86	62	66/66	$1749	486DX2-66	8	540	ISA, VLB
16	CompuAdd C466D	6	8	86	56	70/72	$2000	486DX2-66	8	425	ISA, VLB
17	Polywell Poly 486-40DX	8	7	86	51	64/70	$1580	AMD 486DX-40	8	420	ISA, VLB
18	Gateway P5-60 Family PC	–	1	85	77	69/72	$2499	Pentium-60	8	730	ISA, PCI
19	Austin Power System 60	10	5	85	64	68/76	$2209	Pentium-60	8	420	ISA, PCI
20	Polywell Poly 586-66V1	14	3	85	93	64/70	$2395	Pentium-66	8	420	ISA, VLB

[1] Call 800/434-4495 and use the fax reprint numbers listed in the table to order fax copies of system reviews. You may order three systems' capsule reviews for $4.95;a single capsule review plus features table and test report for $4.95; an entire month's review for $9.95 (December 1993 3012, March 3003, May 3005, June 3006, August 3008, September 3009, October 3010,

2 **Zeos Pantera DX2-66**
Quick; configured right.

3 **Zeos Pantera 60**
Snappy $2295 Pentium-60.

4 **VTech Expo 486DX2-66**
$1539 with 540MB hard drive.

5 **EPS P-60 Phantom**
Fast Pentium-60 has it all.

Monitor size/ dot pitch	Vendor contact number	Issue reviewed	Fax reprint number [1]	Reader service no.	Comments
14"/.28	800/438-3343	Aug 94	3125	789	Budget no. 1 is lowest-cost DX4-100 on Top 20s.
14"/.28	800/554-5220	current	3167	760	Fast and solidly configured, but could use a bigger monitor.
14"/.28	800/554-5220	current	3163	759	Fine performer is also on Power Top 20. Buy it with a 15-inch monitor for $95 extra.
15"/.28	800/815-0070	current	3168	756	Ultra-low-cost multimedia PC. But it has no free SIMM sockets, and service rating is low.
15"/.28	800/447-0921	current	3162	749	Pentium-60 matches performance and configuration of many Pentium-90s. On Power Top 20, too.
14"/.28	800/577-2486	current	3169	751	Well-built unit has a respectable configuration and a superb price.
15"/.28	800/815-0070	June 94	3102	790	Set up with one CPU; add a second to get Windows NT multiprocessing. Low service rating.
15"/.28	800/288-0566	current	3164	753	Also a Power Top 20 machine—configured to make a great home-office PC.
14"/.28	800/989-7253	Sept 94	3138	791	Stiff competition drops last month's no. 2 Best Buy way down the list. Service rating is relatively low.
14"/.28	800/733-9188	Dec 93	3052	792	Fine service helps keep this lightly configured PC on the chart.
15"/.28	800/846-2000	June 94	3096	793	Big hard drive and reasonable price help, but heavy competition drops it from Best Buy standing.
15"/.28	800/846-2000	Oct 94	3144	779	Also on the Power Top 20. Priced and configured with optional 64-bit ATI PCI graphics card.
15"/.28	800/577-7526	Nov 94	3160	782	Price drop moves basic machine up. A very good performer. Also on Power Top 20.
15"/.28	800/627-1961	current	3170	747	Nice budget unit. CompuAdd recently upgraded tech support to 24 hours a day.
15"/.28	800/989-9900	Nov 94	3155	794	Big hard drive for the price. Competition drops it from Best Buy. Service rating fairly low.
15"/.28	800/627-1961	May 94	3103	795	A very basic budget box with a solid, middle-of-the-road configuration.
14"/.28	800/999-1278	June 94	3104	796	Penny-pincher's special is still a fair buy, but it's way down from previous months.
15"/.28	800/846-2000	current	3171	750	Fax-modem on well-set-up multimedia PC makes for a great home system. Also on Power Top 20.
15"/.28	800/752-1577	Mar 94	3062	797	This Pentium's rating is buoyed by Austin's good service, but the system performs more like a DX2-66.
15"/.28	800/999-1278	Oct 94	3146	787	Quick, no-frills budget system boasts excellent performance. Also makes Power Top 20.

November 3011, December 1994 3913); and a list of all systems tested by the PC World Test Center for the Top 20s for $4.95. Touch-tone phone required. Payment by Visa or MasterCard.

For more information about all products in this table, circle reader service no. 903.

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NEW Phaser 540

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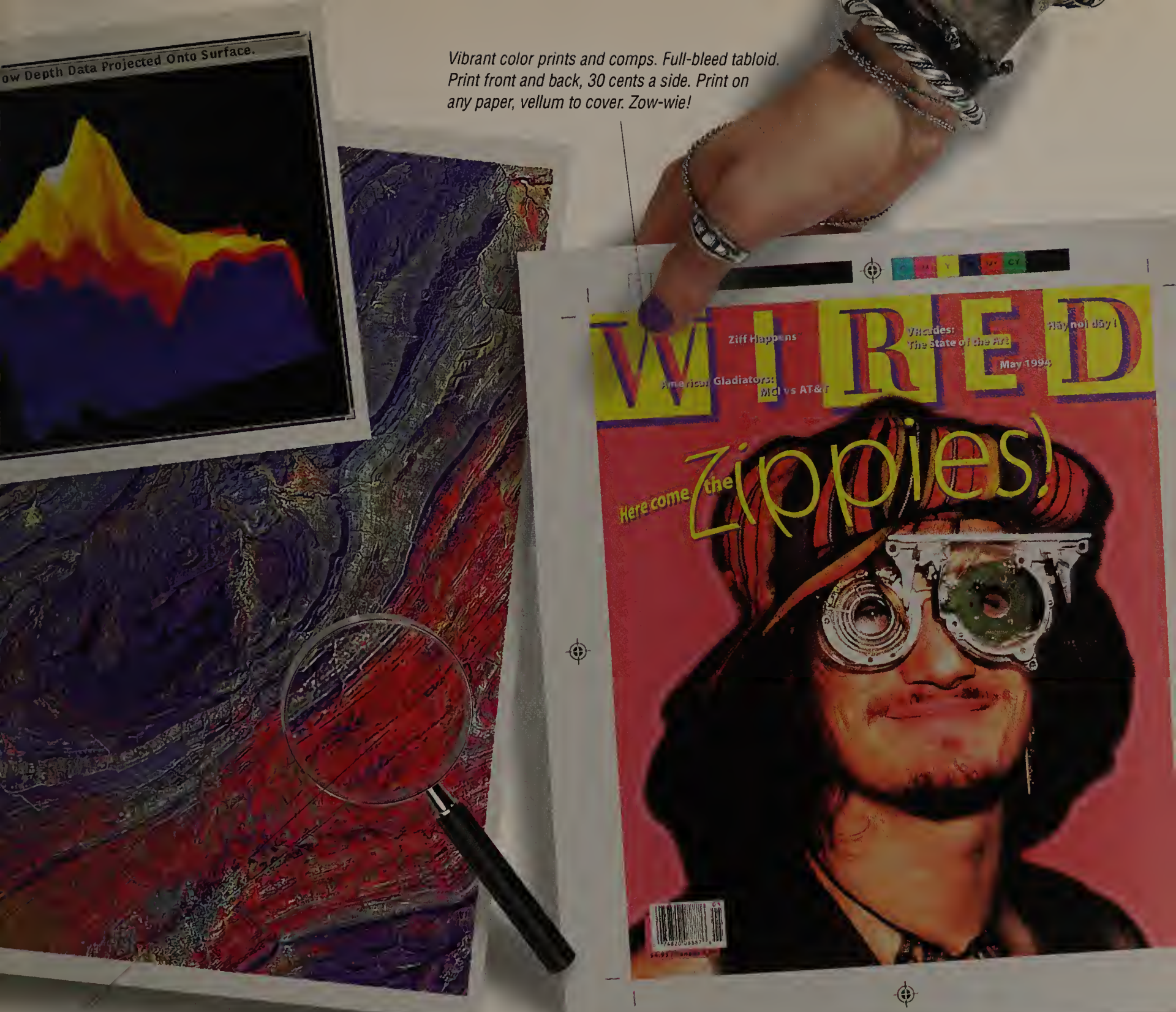

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Circle 124 on reader service card

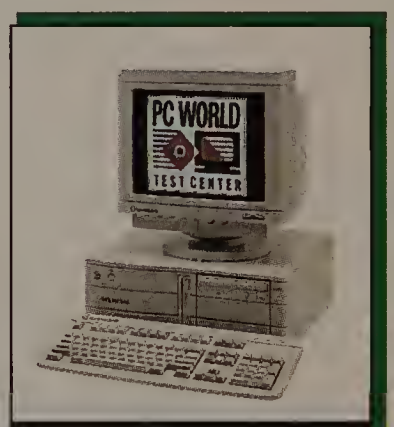
cies, great performance, and a budget price make this unit an all-around budget Best Buy and a strong power contender. *EPS Technologies, 800/447-0921, 602/966-5586* **Reader service no. 749**

Gateway P5-60 Family PC

PC WORLD TOP 20
16 POWER DESKTOP
18 BUDGET DESKTOP

PROS: Multimedia configuration, fax-modem, three-year warranty **CONS:** Long hold times for technical support

Gateway's $2499 P5-60 Family PC is a kissing cousin of the $2459 P5-60 that received a Best Buy in October and that ranks above this system on our current charts. The P5-60 Family PC provides a 14.4-kbps fax-modem, a Jazz16 sound card, and speakers—along with the 32-bit 1MB STB PCI graphics adapter that's standard on all Gateway's P5-60 systems. (The unit reviewed in October is configured with an optional 64-bit 2MB ATI PCI graphics card, and its somewhat quicker performance makes it a better value for business users.)



Gateway

The P5-60 Family PC has other features that are now standard across the entire P5-60 line: 8MB of RAM (128MB max), 256K of secondary cache, a big 730MB Enhanced-IDE hard drive, a Philips CD-ROM drive, and a 15-inch monitor. You can save $200 if you forgo the modem, sound board, and speakers.

Gateway has put together a solid multimedia system for home users, retaining very good Pentium-60 performance and keeping the price affordable. The company even throws in a CD-ROM loaded with Microsoft programs likely to be welcome in a family setting: Encarta, Cinemania 94, Golf, Money, and Works. The compact Family PC offers two free externally accessible drive bays. One PCI and two 16-bit slots are also free along with another slot that accepts either a 16-bit ISA card or a PCI card.

Gateway now covers its desktops with a three-year warranty, which includes 18-hour toll-free tech support (5 hours on Saturdays). Getting through to Gateway can still take 10 minutes or so, according to respondents rating the company on our Reliability and Service Monitor. Still, these readers indicate the help received was worth the wait. This PC's solid performance, affordable price, and quality components make for both Budget and Power Desktops Top 20 rankings—and a system well worth taking home to the family. *Gateway 2000, 800/846-2000* **Reader service no. 750**

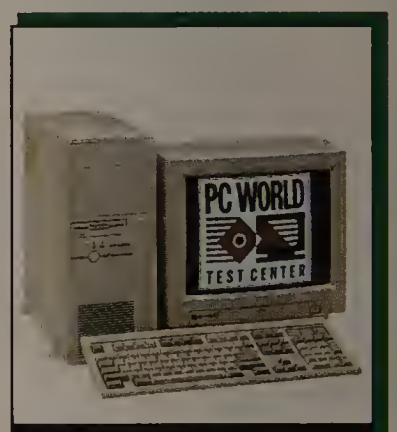
Intelesys P5-60

PC WORLD TOP 20
6 BUDGET DESKTOP

PROS: Great price, good expandability, uncluttered interior **CONS:** 14-inch monitor

This Pentium-60 minitower just misses a budget desktop Best Buy, and anyone searching for a system around the $2000 price point should give it a close look. For a mere $1999, Intelesys gives you 8MB of RAM (128MB max), 256K of secondary cache, and a 430MB hard drive. Its performance is respectable, and the video adapter is a solid 2MB Diamond Stealth 32-bit card, but the monitor is just a 14-inch model.

Expandability is pretty good: Four drive bays are free (three externally accessible), as are four 16-bit and two PCI slots. You can add another 16-bit slot to the total (and give up a free PCI slot) by moving the graphics adapter from the shared PCI/16-bit slot to one of the two free dedicated PCI slots. All the 16-bit slots accept a full-length card, and there's no cable clutter.



Intelesys

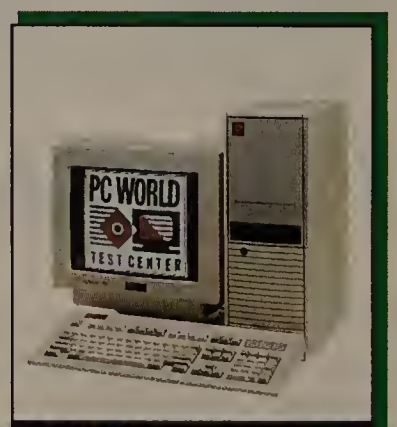
Service and support includes a couple of split-level policies. The warranty covers parts for three years but labor for just one year (on-site). Toll-free tech support is available around the clock weekdays, 6½ hours on Saturdays, for the first year—when you're most likely to need it—and 8½ hours a day weekdays only thereafter. Because Intelesys is a newcomer to our pages, we can't report on its track record, but if this machine indicates the company's commitment to quality, Intelesys's future looks bright. *Intelesys, 800/577-2486* **Reader service no. 751**

Polywell Poly 590-P3

PROS: Great performance, 2MB caching drive controller, CD-ROM drive
CONS: None

Polywell PCs rarely fail to achieve sizzling performance in their CPU class, but this full-size tower system is a powerhouse in *any* processor category. In fact, this Pentium-90 is close to being the fastest PC we've reviewed; its hot performance (especially in the disk-intensive Paradox for DOS test) is helped by the 2MB PCI caching hard disk controller.

The $3250 Poly 590-P3 features 16MB of RAM, 256K of secondary cache, a 545MB hard drive, a CD-ROM drive, a 2MB PCI graphics adapter, and a 15-inch monitor. Four drive bays are free, along with one PCI slot, one shared PCI or 16-bit slot, and two 16-bit slots. Two 72-pin SIMM sockets are also free.



Polywell

Service and support policies include a two-year parts, five-year labor warranty and tech support during regular business hours and for 6 hours on Saturdays. This fine value of a system is a testimonial to the quality of the power desktop systems reviewed here: The Poly 590-P3 has no significant drawbacks, yet it missed our Power Desktops Top 20 by a hair. With the number of strong PC values we're reviewing every month, it's not infrequent that a solid unit like this one doesn't quite achieve the lofty overall ranking it now takes to make our Top 20s. The difference between the rating of this Polywell system and the units that just made our chart is really quite small. A minor change—such as a slightly lower price—would make it a Top 20 PC. *Polywell Computers, 800/999-1278, 415/583-7222* **Reader service no. 752**

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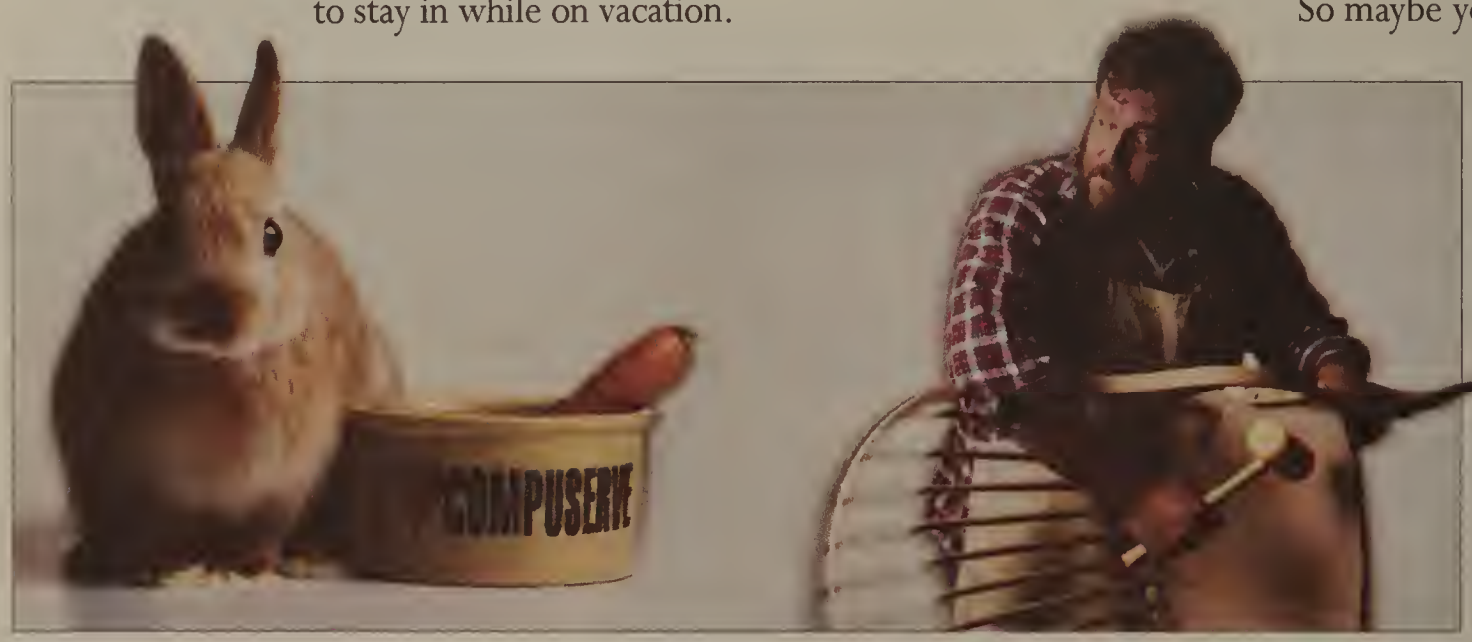

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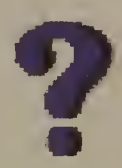

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Quantex QP5/60W-2

PC WORLD TOP 20
8 BUDGET DESKTOP
12 POWER DESKTOP

PROS: Ample configuration, attractive price, good performance **CONS:** No weekend tech support

Generally speaking, unless your system allowance is tight, your optimum budget desktop buy is no longer a 486DX2-66. Savvy mainstream buyers are now turning to value-priced DX4-100 and Pentium models. Quantex's big QP5/60W-2 tower is an example of the kind of deal you can expect on an affordable Pentium-60 these days. Costing just $2349, it ran our benchmarks faster than the typical system in its class—nearer the level of a Pentium-66.

The Quantex is a lot of PC for the money, including 16MB of RAM (128MB max), 256K of secondary cache, and a 540MB hard drive. You get a 1MB 32-bit PCI graphics card, a 15-inch monitor, a CD-ROM drive, and a 14.4-kbps fax-modem and software. Expandability is good, starting with two free SIMM sockets. Three 16-bit slots are free, along with another you can use for either a 16-bit or a PCI board. An impressive seven drive bays are free (three externally accessible). The cabling is a bit untidy, but in the overall scheme of things, that's only a minor annoyance.

Quantex

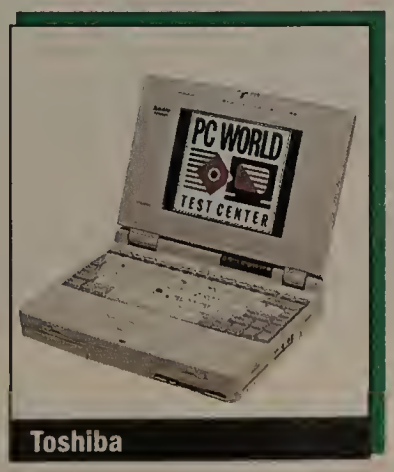
Quantex's support policies are basic fare, with a one-year on-site warranty and 11-hour weekday tech support. The balanced offering of solid configuration, snappy performance, and budget price makes this tower very attractive. Although the unimpressive support package stops the QP5/60W-2 short of a Best Buy, its position on our Budget Desktops Top 20 is well earned, and it has enough muscle to nab a slot on the Power Desktops Tops 20 as well. *Quantex Microsystems, 800/288-0566* **Reader service no. 753**

Toshiba Satellite T2400CT

PC WORLD TOP 20
9 POWER MOBILE PC

PROS: Good performance, excellent design, strong support
CONS: High price

When it comes to notebook computing, today's road warriors want it all—fast performance, solid battery life, and excellent design and construction. The $3999 Toshiba Satellite T2400CT certainly fits the bill. This 486DX2-50 notebook recorded one of the best overall performance scores we've seen in its processor class, while a brilliant active-matrix color display and ergonomic design will please the most demanding user.



Toshiba

The unit comes with 8MB of RAM (20MB max) and a 525MB hard drive and accepts one PCMCIA Type III or two Type II peripherals. Despite the drain of an 8.5-inch active-matrix screen, the system ran for nearly 4 hours in our battery-rundown test.

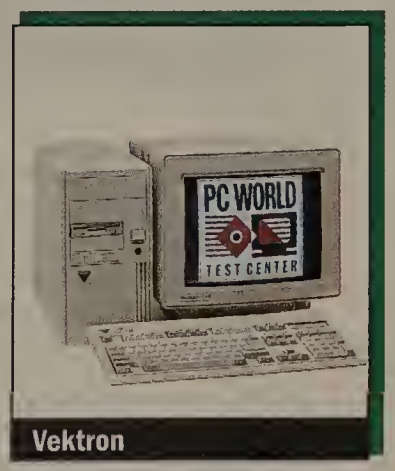
The buying decision often comes down to the fine points, and the Satellite T2400CT clinches its case with top-notch design, including the IBM TrackPoint–like AccuPoint pointing device and the keyboard with well-shaped, well-placed keys and a solid touch. The light, compact AC adapter helps keep traveling weight to a light 7.4 pounds. In addition, the Satellite boasts a solidly durable chassis with a tight screen hinge. Finally, the Satellite includes built-in audio with jacks for a microphone and headphones. Toshiba provides a handy suite of Windows utilities for adjusting power-saving options and checking configuration data.

The Satellite is backed by Toshiba's strong support package, including a one-year warranty with a $200 optional upgrade to three years, 24-hour tech support, and a two-day turnaround policy on factory repairs. The Satellite T2400CT is a solid player, and it earns a spot on our Power Mobile PCs chart. *Toshiba America Information Systems, 800/334-3445* **Reader service no. 754**

Vektron PCI Power Station/60

PROS: Solid budget price and configuration, three-year warranty
CONS: No weekend tech support, accepts only one full-length card

You've probably noticed: Nicely configured and attractively priced budget Pentium-60 PCs are the order of the day. The Vektron PCI Power Station/60 minitower fits right into the genre, with a solid—if unexceptional—configuration: You get 8MB of RAM, 256K of secondary cache, and a 420MB Western Digital Caviar 2420 hard drive. In addition, Vektron supplies a Diamond Stealth 64 64-bit PCI adapter and a nice 15-inch ADI MicroScan 4GP Energy Star MPR II monitor. Not bad at all for just $2165.



Vektron

Performance is quite good with this system—a bit better overall than that of a typical 60-MHz Pentium PC. The interior of the sturdy case is clean and intelligently laid out, with everything easily accessible. You can expand system memory up to a whopping 192MB, and four of six SIMM sockets are free, allowing for easy RAM upgrades. The secondary cache is upgradable too—you can boost it up to a 512K ceiling. Three 16-bit slots are free, as is another slot that accepts either a 16-bit or a PCI board. But because of the high heat-sink/fan assembly, only one 16-bit slot and the 16-bit or PCI slot accept full-length cards. This limitation is not unusual these days, as the need for the full length is rare today. Three drive bays are free, all externally accessible.

Vektron's service policies are attractive, starting with a three-year warranty backed by a 30-day money-back guarantee and a year of free on-site service. In addition, Vektron offers an optional warranty and on-site extension to four years for a reasonable $169.95 per year. Tech support is available weekdays only during typical business hours. On balance, this is a very good system, well worth considering if you're looking for a solid budget PC—even if it does just miss our Budget Desktops Top 20. (Note: A last-minute call at press time informed us that Vektron's price on this unit has dropped to $1999.) *Vektron Int'l, 800/725-0020* **Reader service no. 755**

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Word about PCs from Hewlett-Packard is getting around, and ratings are soaring. According to a recent CRN/Gallup survey, "Use of HP desktops in Fortune 1000 companies has doubled in the last year."‡

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If you're connecting PCs to a network, scan this chart and you'll see it's time to hook up with HP.

STANDARD NETWORKING FEATURES	HP VECTRA XM2 PC	HP VECTRA M2 PC	COMPAQ DESKPRO/XE	DELL NETPLEX
Advanced Bus Architecture	PCI	VL		
Integrated Networking Interface	32-bit	16-bit		
Integrated, multiprotocol Boot-ROM	X	X		
ISA Plug-n-Play Compliant	X	X	X	
Multilevel Security Features	X	X	X	X
Asset tracking	X	X	X	
PC tattooing	X	X	X	
Optional Desktop Management Software	X	X		
Bi-directional parallel port	X	X	X	X
Desktop Management Interface (DMI)[3]	X	X		

HP quality in value-priced PCs.

- *Intel 33-MHz 486SX, 50- and 66-MHz 486DX2, 100-MHz DX4, upgradable to Pentium Overdrive; Intel 60-MHz Pentium*
- *Chip upgrades to higher performance*
- *On-board accelerated local-bus video*
- *210-MB hard drive[1]*
- *4-MB RAM, expandable to 64-MB*
- *512 KB or 1 MB of Video RAM standard*
- *ISA Plug-n-Play compliant*

HP Vectra VL2

- *Desktop Power Management*
- *EPA Energy Star certified*
- *Local bus Fast-IDE hard disk interface**
- *1280 x 1024 video resolution**
- *Optional 128- or 256-KB cache memory**
- *Free three-year limited warranty for parts and labor[2]*

from
$1,049†

High-performance network-ready PCs in a slimline package.

- *Intel 33-MHz 486SX, 50- and 66-MHz 486DX2, upgradable to Pentium Overdrive*
- *Optional 128- or 256-KB second level cache*
- *210-MB, 14-ms Fast-IDE hard drive[1]*
- *32-bit Fast-IDE local-bus hard disk interface*
- *8-MB RAM, expandable to 96-MB*
- *Ultra VGA2 local-bus accelerated video supporting up to 1280 x 1024 resolution*

HP Vectra N2

- *1 MB of video RAM standard, expandable to 2 MB*
- *Slimline package with two mass storage shelves and three ISA slots*
- *Optional integrated 10Base-T networking*
- *Multilevel security*
- *EPA Energy Star certified*
- *ISA Autoconfiguration utility (Plug-n-Play)*
- *Integrated Desktop Management Interface (DMI)[3]*
- *Free three-year limited warranty for parts and labor[2]*

from
$1,429†

High-performance PCs for the connected office.

- *Intel 33-MHz 486SX; 50- and 66-MHz 486DX2, 100-MHz DX4, upgradable to Pentium Overdrive*
- *Optional 128- or 256-KB second level cache*
- *Four mass storage shelves; four expansion slots*
- *One available 32-bit VL-bus slot*
- *210-MB, 14-ms Fast-IDE hard drive[1]*
- *32-bit Fast-IDE local-bus hard disk interface*
- *8-MB RAM, expandable to 96-MB*

HP Vectra M2

- *Ultra VGA2 local-bus accelerated video supporting up to 1280 x 1024 resolution*
- *Optional integrated 10Base-T networking*
- *Systems Diagnostics Utility*
- *EPA Energy Star certified*
- *ISA Autoconfiguration utility (Plug-n-Play)*
- *Integrated Desktop Management Interface (DMI)[3]*
- *Free three-year limited warranty for parts and labor[2]*

from
$1,509†

Exceptional 486 performance for advanced business use.

- *Intel 50- and 66-MHz 486DX2, 100-MHz DX4, upgradable to Pentium Overdrive*
- *PCI architecture*
- *Standard 256-KB second level write-back cache*
- *Four mass storage shelves; four expansion slots*
- *Two available 32-bit PCI expansion slots*
- *210-MB, 14-ms Fast-IDE hard drive[1]*
- *32-bit PCI IDE hard disk interface*

HP Vectra XM2

- *8-MB RAM, expandable to 96-MB*
- *PCI Integrated 64-bit S3 Vision-864 graphics accelerator supporting up to 1280 x 1024 resolution*
- *Optional PCI Integrated 32-bit 10Base-T networking*
- *Integrated Desktop Management Interface (DMI)[3]*
- *EPA Energy Star certified*
- *Free three-year limited warranty for parts and labor[2]*

from
$2,069†

The ultimate PC for advanced business and technical applications.

- *Intel 90-MHz Pentium Processor*
- *Second processor socket for MP Spec 1.1 multi-processing*
- *Standard 256-KB second level asynchronous or burst asynchronous write-back cache*
- *PCI architecture*
- *Four mass storage shelves (three front accessible); five expansion slots*
- *Two available 32-bit PCI expansion slots*
- *270-MB, 12-ms Fast SCSI-2 hard drive[1]*

HP Vectra XU

- *Integrated 32-bit PCI SCSI-2 interface*
- *PCI integrated 64-bit S3 Vision-864 graphics with 1280 x 1024 resolution or PCI MGA Ultima Plus graphics with up to 1600 x 1200 resolution*
- *32-bit PCI IDE hard disk interface*
- *8 or 16 MB of RAM, expandable to 256 MB*
- *PCI Integrated 32-bit 10Base-T networking*
- *Integrated Desktop Management Interface (DMI)[3]*
- *Free three-year limited warranty for parts and labor[2]*

from
$3,749†

All HP Vectra PCs come with MS-DOS® 6.2 and MS Windows for Workgroups 3.11 pre-installed; HP mouse and keyboard included. *Feature included with some models. †U.S. list price, dealer prices may vary. Monitor not included. [1]Other capacities available. [2]First year on-site, 24-hour service. Second and third year return to dealer. [3]Available 10/1/94. ‡With permission CRN/Benchmark. MS-DOS is a U.S. registered trademark and Windows is a trademark of Microsoft Corporation. Pentium and the Intel Inside logo are U.S. trademarks of Intel Corporation. PPG407 ©1994 Hewlett-Packard Company

THE PC WORLD TOP 20

MOBILE PCs

1 **Compaq LTE Elite**
Performance, features, quality.

➤ New this month ◄ No change from last month
▲ Up from last month ▼ Down from last month

POWER SYSTEMS

		Last month	Months on chart	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1	◄ Compaq LTE Elite	1	3	107	48	83/89	$5429	DX4-75	8	340
2	◄ Toshiba Portégé T3600CT	2	2	104	41	80/80	$4199	486DX2-50	8	250
3	◄ TI TravelMate 4000M	3	2	102	54	69/78	$4250	DX4-75	8	340
4	◄ AST Ascentia 900N	4	3	100	45	66/72	$5929	DX4-75	8	510
5	➤ WinBook XP	–	1	99	43	62/70	$4029	DX4-75	8	520
6	➤ Austin Business Audio 4/100	–	1	99	69	62/71	$4799	DX4-100	16	525
7	➤ Compaq LTE Elite 4/40CX Model 170	–	1	98	34	83/89	$4254	486DX2-40	8	170
8	▼ AT&T Globalyst 200 (486DX2-50)	6	4	98	41	74/83	$3995	486DX2-50	8	250
9	➤ Toshiba Satellite T2400CT	–	1	98	41	80/78	$3999	486DX2-50	8	525
10	▼ FutureTech FutureMate 7500	7	2	97	58	62/71	$2912	DX4-100	8	344

BUDGET SYSTEMS

1	▲ Toshiba Portégé T3400	2	7	100	29	80/78	$1299	486SX-33	8	120
2	▲ IBM ThinkPad 355	4	5	98	29	75/83	$1999	486SX-33	4	170
3	▼ Compaq Contura Aero 4/33C Model 170	1	6	97	28	83/89	$2044	486SX-33	8	170
4	▲ Gateway Handbook DX2-40	5	5	96	27	62/85	$1499	486DX2-40	8	130
5	➤ CTX EzNote	–	1	96	36	62/69	$2149	486DX2-50	8	250
6	➤ AT&T Globalyst 200 (486SX-33)	–	1	93	34	74/83	$2710	486SX-33	8	170
7	▼ Twinhead Slimnote 550S	6	2	92	36	62/69	$2749	486DX2-50	8	340
8	▼ Toshiba Satellite T1960CS	7	3	90	31	80/80	$2599	486DX2-50	4	200
9	▼ Toshiba Portégé T3400CT	8	2	90	23	80/78	$2499	486SX-33	4	120
10	▲ AST Ascentia 800N	11	1	89	28	66/72	$2649	486DX2-50	4	250

Best Buy

[1] CA = color active, CD = color dual-scan, CP = color passive, MP = mono passive.

[2] Call 800/434-4495 and use the fax reprint numbers listed in the table to order fax copies of system reviews. You may order three systems' capsule reviews for $4.95;a single capsule review plus features table and test report for $4.95; an entire month's review

2 Toshiba Portégé T3600CT
A subnote for power buyers.

1 Toshiba Portégé T3400
$1299 mono subnote.

2 IBM ThinkPad 355
Mono subnote's a Best Buy again.

Weight (pounds)	Battery life (hours)	Screen type/size[1]	Vendor contact number	Issue reviewed	Fax reprint number[2]	Reader service no.	Comments
7.2	6:32	CA/9.5"	800/345-1518	Oct 94	3650	798	This one has it all: speed, battery life, portability, features.
6.2	6:48	CA/8.4"	800/334-3445	Nov 94	3653	799	Top-ranked subnote has super battery. Small screen, but quality display.
7.5	3:35	CA/8.5"	800/527-3500	Nov 94	3654	800	Multimedia-ready notebook with video playback and quality sound built in.
8.2	6:44	CA/10.4"	800/876-4278	Oct 94	3651	801	Great screen, battery life, hard drive. Deluxe system—with a deluxe price.
7.4	4:26	CA/9.4"	800/468-2162	current	3660	757	Loaded: fine screen, hefty hard drive, 14.4-kbps fax-modem.
8.4	3:08	CA/9.4"	800/752-1577	current	3661	745	Fastest notebook yet, with 16MB of RAM: a super desktop replacement.
7.2	8:26	CA/8.4"	800/345-1518	current	3662	746	Battery life sets record, service and reliability are tops. A bit slow.
7.4	3:33	CA/9.5"	800/637-2600	Sept 94	3647	802	Nimble, reliable, and well designed. A fine traveling companion.
7.4	3:56	CA/8.5"	800/334-3445	current	3663	754	Quality full-size notebook has brilliant screen, great reliability.
8.4	3:34	CD/9.5"	800/275-4414	Nov 94	3656	803	Great performance at a remarkably low price.
5.8	6:31	MP/8.5"	800/334-3445	June 94	3627	804	Basic mono subnote with great battery life, small hard disk, fantastic price.
6.6	5:40	MP/9.5"	800/426-7735	Aug 94	3645	—	No-nonsense mono workhorse with long battery life regains Best Buy status.
5	6:18	CP/7.8"	800/345-1518	July 94	3637	806	Color subnote has outstanding battery life but no external-display connector.
5	5:06	MP/7.8"	800/846-2000	Aug 94	3646	807	Inexpensive mono subnote's a good machine, but hard drive is quite small.
6.8	5:12	CD/7.8"	800/888-9052	current	3664	748	Great price on light, quick notebook, but so-so screen, keyboard, and finish.
7	4:45	CD/9.4"	800/637-2600	current	3665	743	September's 33-MHz Globalyst, but more RAM, and faster.
7.4	5:21	CD/9.5"	800/995-8946	Nov 94	3659	808	Full-size notebook with quality color screen and good battery life.
8.4	3:31	CD/9.5"	800/334-3445	Oct 94	3652	809	Notebook for business travelers has reasonable price and good quality.
6	5:30	CA/7.4"	800/334-3445	April 94	3606	810	Subnote is the only budget mobile unit with a color active screen.
6.8	3:07	CD/9.5"	800/876-4278	Nov 94	3666	811	Thoughtfully designed; exceptionally fine dual-scan screen.

for $9.95 (April 3004, June 3006, July 3007, August 3008, September 3009, October 3010, November 3011; December 3913); and a list of all systems tested by the PC World Test Center for the Top 20s for $4.95. Touch-tone phone required. Payment by Visa or MasterCard.

For more information about all products in this table, circle reader service no. 904.

VTech Expo 486DX2-66

PC WORLD TOP 20 4 BUDGET DESKTOP

PROS: Low price, sound board, CD-ROM drive
CONS: No free 30-pin SIMM sockets

We set the line on budget desktops at $2500, but many buyers want a PC that costs much less. If you're in this camp, VTech has a Best Buy 486DX2-66 for you. The Expo 486DX2-66 sells for just $1539—and it includes a multimedia setup: CD-ROM drive, sound card, speakers, and headphones.

The unit features a solid configuration, with 8MB of RAM expandable to 32MB, 128K of secondary cache, and a 540MB hard drive. Multimedia mavens will appreciate the 15-inch monitor and 2MB VL bus graphics card.

VTech

Don't let the rock-bottom price lead you to expect subpar performance: Our tests indicate this system performs well for its CPU class. And with four free drive bays—three of them externally accessible—a pair of free VL bus slots, and one free 16-bit and one free 8-bit ISA slot, you have adequate room to upgrade. However, all eight SIMM sockets, which are of the older 30-pin variety, are filled, so think about ordering this box with 16MB of RAM. That way you won't have to discard SIMMs later to make room for an upgrade. Keep in mind that 32MB is the RAM ceiling on this unit.

VTech's support policies include a one-year warranty, a year of free on-site service, and 11 hours of toll-free tech support weekdays plus 6 hours on Saturdays. Respondents rating VTech on our Reliability and Service Monitor indicate a fairly high incidence of unresolved problems, however. Even taking that factor into account, this multimedia system is a Best Buy value for the tight-budget buyer. *VTech, 800/815-0070* **Reader service no. 756**

WinBook XP

PC WORLD TOP 20 5 POWER MOBILE PC

PROS: Large hard drive, good performance, excellent documentation **CONS:** None

The $4029 WinBook XP is a fast, well-set-up DX4-75 notebook with 8MB of RAM, an impressive 520MB removable hard drive, and an eye-pleasing 9.4-inch active-matrix color screen. Furthermore, the 4.5-hour battery life should stand you in good stead on the road.

WinBook

This 7.4-pound machine provides a PCMCIA Type III slot, which alternatively accepts two Type II cards. WinBook includes a 14.4-kbps fax-modem and software. The keyboard has a workable layout and should please users who like keys with a definite click and full travel. You can choose an eraser-like pointing device, a trackball, or both. Give up one or the other and knock $30 off the price. We appreciated WinBook's well-organized, nicely illustrated manual, and there's a one-year warranty and 13-hour-a-day tech support (including Saturday hours). We found a lot to like in this capable, well-outfitted mobile unit. It earns its spot on our Power Mobile PCs shortlist. *WinBook Computer, 800/468-2162* **Reader service no. 757**

Zenon Z-Titan Pentium 66

PC WORLD TOP 20 19 POWER DESKTOP

PROS: Strong performance, good expandability
CONS: No weekend tech support

Some early Pentium systems never lived up to their high-speed billing. Now, a year after Pentiums first made a splash in our pages, they are delivering the full performance payoff. Many are much faster than you'd expect from their CPU designations. This Zenon system, for example, performs more like a 90-MHz than a 66-MHz Pentium. And this is a fine business system to boot. At $2699, this isn't a budget PC, but it deserves its good marks as a power system. Zenon's package includes 16MB of RAM, 256K of secondary cache, a 540MB hard drive, a CD-ROM drive, ATI's impressive 64-bit WinTurbo graphics card with 2MB of VRAM, and a quality 15-inch Mag DX15F monitor.

Expandability inside the handsome tower case is good. Zenon minimizes cable clutter to maximize free space. Three free bays (two externally accessible) allow plenty of room to add drives, and all three free 16-bit ISA slots accept full-length cards, as do the two free PCI slots. If you prefer to add one more 16-bit slot to the total and can live with one less PCI slot, simply move the installed ATI graphics card from the shared slot to one of the two free dedicated PCI slots.

Zenon

Although Zenon's support package isn't competitive with the top-tier vendors', it's not bad: You get a one-year on-site service warranty and 12-hour toll-free tech support on weekdays. Since Zenon is new to our pages, however, we can't report a track record. This powerful performer rates a spot in our Power Desktops Top 20, and if the tech support package were more robust, it would rank even higher. *Zenon Computer System, 800/899-6119, 818/935-1828* **Reader service no. 758**

Zeos Pantera 60

PC WORLD TOP 20 3 BUDGET DESKTOP
9 POWER DESKTOP

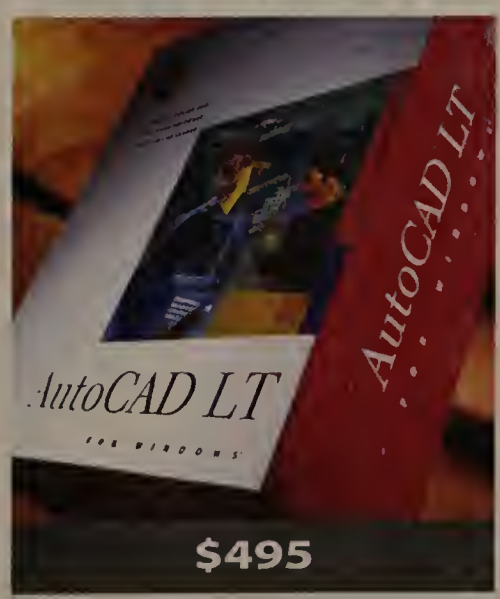
PROS: Bargain price, strong 60-MHz Pentium performance **CONS:** 14-inch monitor

Bargain hounds take note: We've tracked down a new Budget Desktops Top 20 winner: the Pantera 60 from Zeos. Its Best Buy comes courtesy of an attractive $2295 price and performance that's more representative of a quick Pentium-66 than of the installed Pentium-60. The compact system provides 8MB of RAM (192MB max), 256K of secondary cache (512K max), a roomy 530MB Seagate hard drive, a CD-ROM drive, and integrated 12-bit audio (no speakers or headphones, though). The 1MB 64-bit Diamond Speedstar PCI graphics accelerator is fine, but the

The success of AutoCAD has inspired dozens of cheap imitations.

If you need a CAD package but don't need all the sophistication of AutoCAD® software, don't settle for a cheap imitation. Get new AutoCAD® LT for Windows.™ Unlike those "bargain" packages, it's based on the world standard—AutoCAD—and gives you features the others can't duplicate. Like more accurate 2D drawing tools for designing discrete parts. 3D design and layout tools and full support for layers and blocks. And drawings you can link, so changes on the master are automatically reflected in other drawings. What's more, making these drawings is as easy as using a few simple icons and tools. But if you do find yourself with a question, you'll have access to on-line help as well as free 90-day product support. And since AutoCAD LT reads and writes data just like AutoCAD software, your work will be compatible with over a million AutoCAD users worldwide. Chances are your clients and colleagues are among them. So beware of cheap imitations. Visit your Authorized AutoCAD Dealer or leading retail software store. Or, for a free demo disk, call 1-800-228-3601 and ask us for Demopack A216. Outside the U.S. and Canada, fax 415-491-8311.

And one inexpensive one.



Autodesk.

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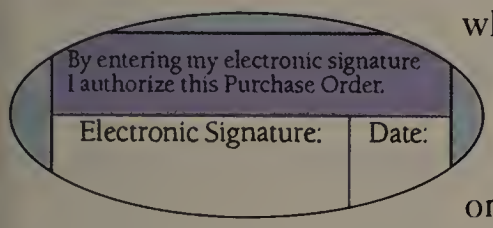

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GroupWise 4.1—Comprehensive integrated E-mail, calendaring, scheduling and task management. GroupWise 4.1 enables you to share information across almost any platform, gateway or network.

InForms—More than an electronic forms program. Now you can create and design forms and views, access multiple databases in real time and, via E-mail, digitally sign forms requiring immediate approval.

SoftSolutions—The leader in document management solutions. You can secure information and access data (text, graphic or video) anywhere on the network, regardless of its application or platform.

GroupWise

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FEATURES COMPARISON: THIS MONTH'S CONTENDERS–DESKTOPS

Low-Cost Pentiums Bring Power Computing to the Budget Desktop

● Yes
○ No
n/a = not applicable

Standard features	Acma P90	Alaris Nx586 P90	CompuAdd CP60p	BEST BUY EPS P-60 Phantom	Gateway P5-60 Family PC	Intelesys P5-60	Polywell Poly 590-P3	Quantex QP5/60W-2
Street price as of 9/2/94[1]	$2600	$4059	$2299	$2295	$2499	$1999	$3250	$2349
CPU	Pentium-90	Nx586-P90	Pentium-60	Pentium-60	Pentium-60	Pentium-60	Pentium-90	Pentium-60
CPU or upgrade socket	296-pin ZIF	463-pin ZIF	273-pin ZIF	273-pin ZIF	273-pin ZIF	273-pin ZIF	296-pin ZIF	273-pin ZIF
BIOS	AMI 6/16/94	AMI 11/11/92	Phoenix 10/16/93	Award 6/8/1994	AMI 1/24/94	AMI 11/11/92 v1.00.07.AF2	Award 1/4/1994	AMI 11/11/92 1.00.06.AFI
Installed/maximum RAM (MB)	8/128	16/192	8/128	16/192	8/128	8/128	16/128	16/128
30-pin or 72-pin SIMMs	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin
SIMM sockets/number free	4/2	6/2	4/2	6/4	4/2	4/2	4/2	4/2
Secondary RAM cache installed/ maximum (K)	256/256	256/256	256/256	256/512	256/256	256/256	256/512	256/256
Case style	tower	compact	tower	compact	compact	compact	tower	tower
Free externally accessible 3½-inch/ 5¼-inch drive bays	0/2	1/3	0/2	1/1	0/2	0/3	1/2	0/3
Free internal 3½/5¼-inch drive bays	2/2	1/0	2/0	1/1	3/0	1/0	1/0	3/1
Free 32-bit EISA/16-bit ISA/8-bit ISA expansion slots[2]	0/4/0	0/4/0	0/3/0	0/2/0	0/3/0	0/4/0	0/3/0	0/4/0
PCI or VL bus slots/number free[2]	3 PCI/2	2 VLB/0	3 PCI/2	4 PCI/2	3 PCI/2	3 PCI/2	4 PCI/2	3 PCI/1
Hard disk	Conner CFS420A	WD Caviar 2540	WD Caviar 2420	Quantum LPS 540A	Western Digital	Seagate ST3491A	Maxtor 7546A	WD Caviar 2540
Size (MB)	420	540	425	540	730	430	545	540
Adapter	integrated PCI	16MB Bus Logic VLB	integrated PCI	OEM KW-602 PCI	integrated PCI	integrated PCI	2MB OEM DC-690B	DTC 2130S PCI
Floppy drives (MB)	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
Graphics adapter	64-bit Diamond Stealth 64	64-bit Diamond Stealth 64	32-bit Hercules Stingray	64-bit Diamond Stealth 64	32-bit STB W32P	32-bit Diamond Stealth 32	64-bit Diamond Stealth 64	32-bit OEM PCI
Installed VRAM/DRAM (MB)	0/2	2/0	0/1	2/0	0/1	0/2	2/0	0/1
Monitor	Impression 5	Alaris	CompuAdd TE 1564M	Hitachi CM 158MU	Crystal Scan 1572 DG	Impression 5	Sampo KDM 1566 V	OEM TE1564 Superview 1280
Screen diagonal (inches)/ dot pitch (mm)	15/.28	14/.28	15/.28	15/.28	15/.28	14/.28	15/.28	15/.28
Modem speed for fax/data (kbps)	n/a	n/a	9.6/9.6	n/a	14.4/14.4	n/a	n/a	14.4/14.4
Sound board	○	○	○	○	Gateway Jazz16	○	○	○
CD-ROM drive	○	○	Mitsumi FX001D	Mitsumi FX001D	Philips CM206	○	Matsushita CR-55628	Sony CDU33A
Data transfer rate (K/sec)	n/a	n/a	300	300	350	n/a	300	300
Parallel/serial/mouse/SCSI ports	1/2/0/0	1/2/0/0	1/2/0/0	1/2/0/0	1/2/1/0	1/2/0/0	1/2/0/0	1/2/0/0
Service and support								
Warranty (years)	1	3	1	3/1[3]	3	3/1[3]	2/5[4]	1
30-day money-back guarantee	●[5]	●	●	●[6]	●	●	●	●
On-site service first-year price	free	$79	free	free	free	free	$75	free
Service center turnaround (days)	3	3	3	2	none	3	3	1
Daily toll-free phone support (hours)	10	10	24	12	18	24[7]	9	11
Weekend support	○	○	●	●[8]	●[8]	●[8]	●[8]	○
BBS	●	○	●	●	●	○	●	○
Fax	●	●	●	●	●	●	●	●

[1] All systems priced as configured with DOS 6.0 or later version, Windows 3.1, VGA and color monitor, keyboard, and mouse or other pointing device. Selling price is direct or based on vendor estimate.

[2] One less 16-bit slot available when all PCI slots are filled; one less PCI slot available when all 16-bit slots are filled. VL bus slots also accept 8- and 16-bit ISA cards.

[3] Three years parts, one year labor.

[4] Two years parts, five years labor.

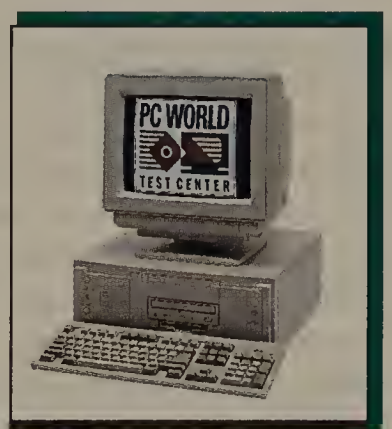
[5] 45-day warranty.

	Vektron PCI Power Station/60	BEST BUY VTech Expo 486DX2-66	Zenon Z-Titan Pentium 66	BEST BUY Zeos Pantera 60	BEST BUY Zeos Pantera DX2-66
	$2165	$1539	$2699	$2295	$2054
	Pentium-60	486DX2-66	Pentium-66	Pentium-60	486DX2-66
	273-pin ZIF	238-pin ZIF	273-pin ZIF	273-pin ZIF	238-pin ZIF
	Award 5/25/94	SystemSoft 2/11/94	AMI 11/11/92 1.00.07.AF2	Phoenix v4.03	Phoenix 7/25/94
	8/192	8/32	16/128	8/192	8/128
	72-pin	30-pin	72-pin	72-pin	72-pin
	6/4	8/0	4/2	6/4	4/2
	256/512	128/256	256/256	256/512	128/256
	minitower	desktop	tower	compact	compact
	1/2	2/1	0/2	1/1	0/1
	0/0	1/0	1/0	0/1	0/1
	0/4/0	0/1/1	0/3/0	0/4/0	0/4/0
	3 PCI/1	3 VLB/2	3 PCI/2	3 PCI/2	3 PCI/2
	WD Caviar 2420	Conner CFA540A	Conner CFA540A	Seagate ST5660A	Seagate ST5660A
	420	540	540	530	530
	Ideal PCI	OEM 16-bit ISA	integrated PCI	integrated PCI	integrated PCI
	1.44	1.44	1.44	1.44	1.44
	64-bit Diamond Stealth 64	Orchid Kelvin 64 bit	64-bit ATI WinTurbo	64-bit Diamond Speedstar	64-bit Diamond Speedstar
	0/1	0/2	2/0	0/1	0/2
	ADI MicroScan 4GP	CTX 1562GM	Mag DX15F	CTX 1451ES	CTX 1541ES
	15/.28	15/.28	15/.28	14/.28	14/.28
	n/a	n/a	n/a	n/a	n/a
	○	AZI Labs Audio 16	○	○	○
	○	Mitsumi FX001D	Mitsumi FX001D	Mitsumi FX001D	Mitsumi FX001D
	n/a	300	300	300	300
	1/2/0/0	1/2/0/0	1/2/0/0	1/2/0/0	1/2/0/0
	3	1	1	1	1
	●	●	●	●	●
	free	free	free	$59	$59
	2	3	3	2	2
	8.5	11	12	24	24
	○	●[8]	○	●	●
	●	●	●	●	●
	●	●	○	●	●

[6] 60-day money-back guarantee.
[7] First year only; thereafter 8.5 hours, weekdays only.
[8] Saturdays only.

monitor is just a 14-incher (a 15-inch upgrade costs just $95 extra).

Expandability is good for a compact, and four of six SIMM sockets are free. You get three free drive bays (two externally accessible), and one PCI and three 16-bit slots are free, along with an additional 16-bit or PCI slot. If you want to use full-length cards, however, note that only two slots accept them. Zeos also offers an integrated SCSI-2 upgrade for a reasonable $49.



Zeos Pantera 60

Zeos's nonstop toll-free technical support schedule is unbeatable, but the one-year warranty is nothing special. On-site service costs $59 for the first year. All in all, the Zeos Pantera 60 is a superb bargain: The system's combination of power and price propels it almost to the top of the Budget Desktops chart. Furthermore, the package is so well balanced, it also earns a high rating on the Power Desktops chart. Nice job, Zeos! *Zeos Int'l, 800/554-5220, 612/362-1234* **Reader service no. 759**

Zeos Pantera DX2-66

PC WORLD TOP 20 2 BUDGET DESKTOP

PROS: Unusually high DX2-66 performance, CD-ROM drive
CONS: 14-inch monitor

Just when we thought Pentium and DX4-100 boxes were relegating DX2-66 desktop PCs to the cheap seats, along comes the number two budget desktop Best Buy Pantera DX2-66. With just 8MB of RAM and 128K of secondary cache, this unit performed dramatically better than typical DX2-66s, outdistancing some slower Pentium-60s. At $2054, it's a prize plum for buyers wanting a compromise between the higher-priced budget Pentiums and cheaper DX2-66s that run as low as $1500.

Like many of its Pantera siblings, this well-built compact features a 530MB Seagate IDE hard drive, along with a CD-ROM drive. Just before press time, Zeos let us know that the company is replacing the proprietary-interface CD-ROM drive with an Enhanced-IDE unit. As a result, the CD-ROM drive will hook up to an adapter on the motherboard, and you'll get one more free slot than the configuration we tested: Our unit had one PCI, one PCI or 16-bit, and three 16-bit slots free. This compact's expandability is also good in other respects: Two SIMM sockets are free, and you get one free externally accessible drive bay. Zeos provides a 2MB PCI graphics controller—but just a pedestrian 14-inch display at this price (a 15-incher is available for only $95 extra). Service is the same as for the Pantera 60. The system's fine budget performance, robust configuration, and reasonable price add up to another easy Best Buy for Zeos. *Zeos Int'l, 800/554-5220, 612/362-1234* **Reader service no. 760**

Zeos Pantera 486DX2-66

System Snapshots

These systems present unique and valuable solutions to end-user needs, but they rate lower as business PCs than the preceding group.

Alaris Cougar EnergySmartPC

PROS: Three-year warranty, Energy Star compliant
CONS: 14-inch monitor, no weekend tech support

Alaris has been around for less than two years, but the company is making a strong transition from motherboard and component design to full PC manufacture. This $1849 Energy Star–compliant system uses the 75-MHz IBM Blue Lightning processor, complemented by a Cyrix math coprocessor and an IBM-manufactured motherboard. Configured with 8MB of RAM (64MB max), a 256K secondary cache (512K max), and a 340MB hard drive, this compact performs at about the level of a typical DX2-50 system (on the slow side for anyone used to a quick DX2-66 or faster). The 14-inch monitor is matched to a 1MB VL bus graphics adapter. You get one VL bus and five 16-bit slots free along with five free drive bays (four externally accessible).

Alaris's support includes a three-year warranty; on-site service costs $79 the first year. Toll-free technical support is available 10 hours daily, weekdays only. Unfortunately this PC's performance level, price, and configuration can't win it a spot on our shortlist. *Alaris, 800/317-2348* **Reader service no. 761**

Compaq Deskpro XL 450 Model 270

PROS: Three-year warranty, integrated audio
CONS: Slow performance, high price

Like all the other Compaq Deskpros we've looked at recently, this EISA system is superbly designed and assembled. But $2814 is a lot to pay for a compact 486DX2-50 desktop PC with 8MB of RAM and a 270MB hard drive. You get a nice 15-inch monitor and a 1MB PCI QVision 1280 video card. Performance is fairly typical of DX2-50s—in other words, way behind that of Pentiums and DX4s (many of which are better configured for a lot less dough).

Compaq throws in some attractive extras, such as integrated SCSI and ethernet connectors, the best documentation around, and the company's unique audio setup with keyboard-integrated speaker and microphone. You get one free PCI or EISA slot, three free EISA slots, and three free drive bays (two externally accessible). Service and support is great, with Compaq's three-year warranty, year of on-site service, and round-the-clock tech support. But even considering the extras, this system prices itself out of the business mainstream. *Compaq Computer, 800/345-1518* **Reader service no. 762**

Compaq Deskpro XL 466 Model 535/CDS

PROS: Three-year warranty, integrated audio
CONS: Very high price

Sturdy and compact, this is a classic EISA machine with a 486DX2-66 processor mounted on a CPU card, 8MB of RAM, 256K of secondary cache, and a 540MB SCSI hard drive. You get a 15-inch monitor paired with a 2MB PCI QVision 2000 video card, and even a SCSI CD-ROM drive. But $3698 is a high price to pay for a 486 system.

This Deskpro is quick for a DX2-66, although performance falls well short of a typical Pentium-60's. You get one free PCI or EISA slot and three free EISA slots, along with two free drive bays (one externally accessible). The 16-bit audio system and superb service and support mirror the Deskpro XL 450 Model 270's. This is a quality machine, but most users will want more performance for this much money. *Compaq Computer, 800/345-1518* **Reader service no. 763**

CompuAdd CP90p

PROS: 24-hour tech support, fax-modem
CONS: Cluttered internal cabling

At $3228, CompuAdd's CP90p Pentium-90 tower model offers 8MB of RAM, 256K of secondary cache, a 425MB hard drive, a CD-ROM drive, a fax-modem, and a 15-inch monitor driven by a 2MB Hercules Stingray PCI graphics card. Performance is good but not outstanding. You get four free drive bays, and one PCI and two 16-bit slots are free, along with another that accepts a 16-bit or PCI card. As is, all the slots accommodate full-length cards, but adding RAM to the two free SIMM sockets cuts the free full-length slots to one (the remaining free slots will still accept shorter cards).

A welcome addition to CompuAdd's one-year on-site service warranty is 24-hour tech support. All in all, the CP90p is a solid system, but its configuration and performance—at this price—don't quite put it on our Power Desktops Top 20. (Note: At press time, CompuAdd informed us it had changed the graphics card in this PC and dropped the price. Look for a review of the new system soon.) *CompuAdd Computer, 800/627-1961* **Reader service no. 764**

Comtrade PCI Dream Machine 90

PROS: Fastest system yet, good expandability
CONS: Very poor reliability-and-service rating

Talk about extremes: This $3015 Pentium-90 tower of power is the fastest system we've ever clocked, but reader responses place the company dead last in our Reliability and Service rankings. Though the one-year warranty, 12-hour toll-free tech support (Saturdays included), and on-site service for $50 per year sound good, the negative fax-back response raises a red flag for buyers expecting quick, reliable service.

The Comtrade PCI Dream Machine 90 is the fastest system we've ever clocked, but the company ranks dead last in our Reliability and Service Rankings.

The PCI Dream Machine 90 sports a healthy 16MB of RAM, 256K of secondary cache, a big 540MB IDE hard drive, a Mitsumi CD-ROM drive, a 15-inch monitor, and a 2MB Diamond Stealth 64 PCI graphic adapter. Two SIMM sockets, four drive bays, and five expansion slots are free. The fantastic performance and excellent power configuration may sorely tempt you. But considering the company's consistently poor service rating, we just can't recommend this impressive machine. *Comtrade, 800/969-2123* **Reader service no. 765**

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FEATURES COMPARISON: THIS MONTH'S CONTENDERS–MOBILE PCs

Austin DX4-100 Adds Punch to the Power Mobile Lineup

● Yes
○ No
n/a = not applicable

	AT&T Globalyst 200 (486SX-33)	AT&T Globalyst 200 (DX4-75)	Austin Business Audio 4/100	Compaq LTE Elite 4/40CX Model 170	CTX EzNote	Toshiba Satellite T2400CT	WinBook XP
Standard features							
Street price as of 9/2/94[1]	$2710	$4530	$4799	$4254	$2149	$3999	$4029
CPU	486SX-33	DX4-75	DX4-100	486DX2-40	486DX2-50	486DX2-50	DX4-75
Traveling weight (pounds)[2]	7	7.6	8.4	7.2	6.8	7.4	7.4
Width x depth x height (inches)	11.3 x 8.8 x 2.3	11.3 x 8.8 x 2.3	11.3 x 8.7 x 2.2	12 x 9 x 2.1	10 x 8.6 x 1.8	11.8 x 8.8 x 2.2	11.5 x 8.8 x 2
Installed/maximum RAM (MB)	8/20	8/20	16/32	8/24	8/20	8/20	8/32
Secondary RAM cache installed/maximum (K)	0/0	0/0	0/0	0/0	0/0	0/0	0/512
Installed/maximum hard disk (MB)	170/250	250/250	525/700	170/510	250/250	525/700	520/520
Removable hard disk	●	●	○	●	○	○	●
Display type	color dual-scan	color active	color active	color active	color dual-scan	color active	color active
Screen diagonal (inches)	9.4	9.5	9.4	8.4	7.8	8.5	9.4
Maximum colors or gray shades of LCD	256	256	256	256	256	256	256
Simultaneous LCD and external monitor	●	●	●	●	●	●	●
Highest resolution of external monitor	1024 x 768	1024 x 768	1024 x 768	1024 x 768	640 x 480	1024 x 768	640 x 480
Mouse/keyboard ports	1/0[3]	0/1	0/1	1/0[3]	0/1	1/1	1/0[3]
Cursor keys in inverted T	●	●	●	●	●	●	●
Dedicated page-control keys	●	●	●	●	○	●	●
All 12 function keys dedicated	●	●	○	●	○	●	●
Standard <Ctrl> and <Alt> layout	●	●	●	●	○	○	○
Built-in pointing device	●	●	●	●	●	●	●
Modem speed for fax/data (kilobits per second)	n/a	n/a	14.4/14.4	n/a	n/a	14.4/14.4	14.4/14.4
Docking station available	●	●	●	●	○	●	●
PCMCIA slot Type II/III	1/1[4]	1/1[4]	0/1[5]	0/1[5]	0/1[5]	0/1[5]	0/1[5]
Power management							
Supports APM	●	●	○	●	●	●	●
Type of battery	NiMH	NiMH	NiMH	NiMH	NiMH	NiMH	NiMH
Suspend button	●[6]	●[6]	●[6]	●[6]	●	○	●
Suspends when case closed	○	○	○	○	●	○	○
Service and support							
Warranty (years)	3	3	1	3	1	1	1
30-day money-back guarantee	●	●	●	●	○	○	●
On-site/replacement service price for first year	free	free	○	$115	○	$50	○
Turnaround policy (days at service center)	2	2	2	2	3	2	2
Daily toll-free phone support (hours)	24	24	24	24	9	24	13
Weekend support	●	●	●	●	○	●	●[7]
BBS	●	●	●	●	●	●	●
Fax	●	●	●	●	●	○	●

[1] All notebooks priced as configured with DOS 6.0 or later version, Windows 3.1, VGA monochrome or better display, and mouse or other pointing device. Selling price is direct or based on vendor estimate.
[2] Includes computer, adapter, power cord, and external floppy drive if notebook has one.
[3] Mouse port doubles as keyboard port.
[4] Type III slot alternatively accepts one Type II device.
[5] Type III slot alternatively accepts two Type II devices.
[6] Suspends with key combination.
[7] Saturdays only.

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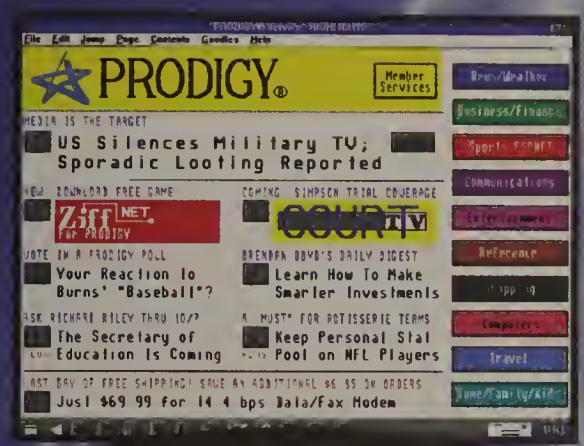

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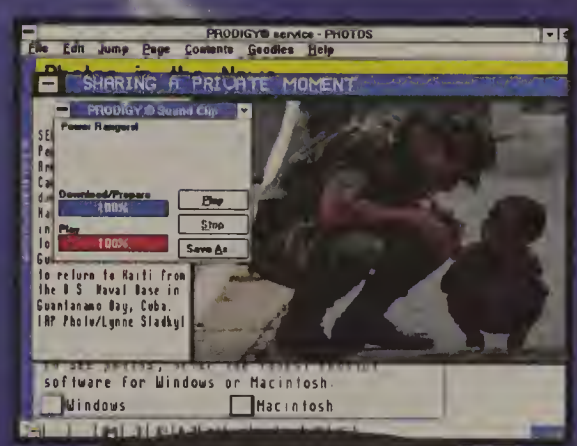
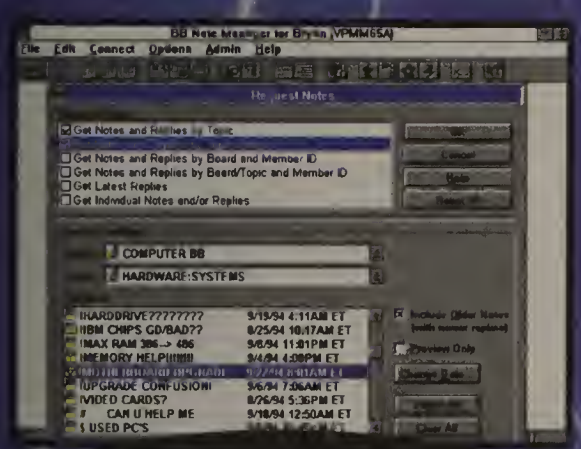
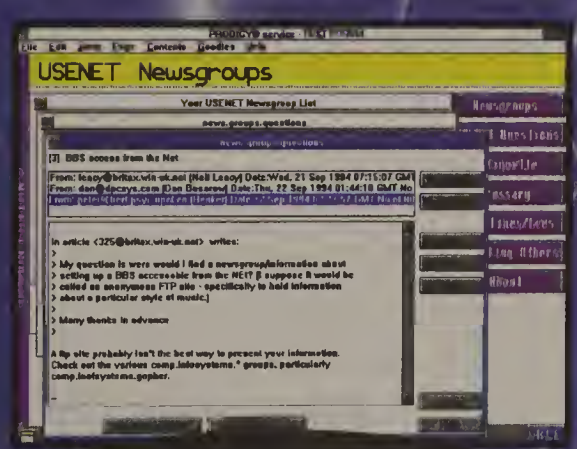


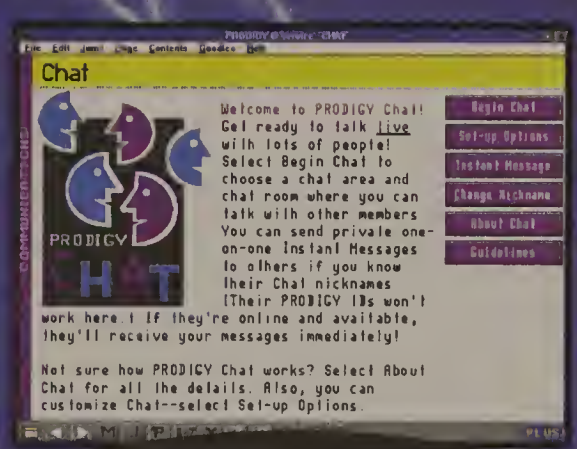
Pull Down Photos



Power Tools



Internet



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- PRODIGY offers 9,600 bps service at no extra cost, and 14,400 bps service is on the way.
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- Journalist turns your computer into a personalized newspaper that updates you every 15 minutes with late-breaking stories on all your favorite topics.

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- Now PRODIGY has advanced Multimedia capabilities like sound bytes and pull-down photos which bring features to life.
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Epson Endeavor P60

PROS: PCMCIA slot
CONS: Too pricey, 14-inch monitor, limited expandability

The compact Epson Endeavor P60 delivers respectable Pentium-60 performance and a good budget configuration: 8MB of RAM, 256K of secondary cache, a 340MB hard drive. and a CD-ROM drive. The integrated 1MB VLB graphics adapter is okay, but the 14-inch monitor is skimpy—and $2724 is above our limit for a budget PC.

Expandability is compromised: There are no free drive bays, and just one PCI slot is free, along with one free 16-bit or PCI slot. Only the latter accepts a full-length card. A PCMCIA Type III slot is installed in an externally accessible drive bay, but we had to unload the PCMCIA drivers before the Endeavor would complete our benchmarks. Support is basic, with a one-year on-site service warranty. (Note: Too late to change our evaluation, Epson announced a price drop of about $400 on this unit.) *Epson America, 800/374-7300, 310/782-5478*

Hewlett-Packard Vectra VL2 4/66

PROS: Good expandability for a slimline compact, three-year warranty
CONS: Flicker at high resolution, no local bus expansion slots, 14-inch monitor

The $2192 Vectra VL2 4/66 is a very fast performer for a budget DX2-66. But the system's generally classy design—a characteristic of the products we typically see from Hewlett-Packard—is still far from flawless. The main drawback is the video subsystem: The small 14-inch monitor's vertical refresh rate tops out at just 60 Hz when running noninterlaced. (Usually it takes 70 Hz or faster to eliminate flicker.) Maximum display resolution is 800 by 600.

The slim compact unit comes with 8MB of RAM (64MB max), 256 of secondary cache, and a 340MB IDE hard drive. The local bus video controller and drive adapter are integrated, leaving all four 16-bit slots free, but there are no VL or PCI bus slots. Four drive bays (one externally accessible) are free. The power supply and drive cages are modular and removable. The Vectra comes with a generous three-year warranty (free on-site service for the first year) and 24-hour tech support. Even for dyed-in-the-wool HP enthusiasts, however, the subpar video system will likely be a turnoff. (Note: At press time HP told us the price on this unit was dropping by about $250.) *Hewlett-Packard, 800/752-0900, 408/553-2922* **Reader service no. 766**

Micron's 486 Home MPC includes 16MB of RAM, a CD-ROM drive, a sound card, speakers, and a joystick, and Micron even throws in a fax-modem.

IBM ValuePoint Performance Series 466 DX2/SP

PROS: Three-year warranty, excellent documentation
CONS: Relatively high price, 14-inch monitor

If you could poke your nose into offices around the country, chances are you'd find a lot of desktop PCs that closely match the configuration on this IBM system: a compact 486DX2-66 with 8MB of RAM, 128K of secondary cache, and a 365MB hard drive. Even a smallish 14-inch monitor with a 1MB video adapter wouldn't be out of place at many sites. If you're ready to buy a system currently, however, you can expect more. Especially if you're paying $2444. Not that the ValuePoint Performance Series 466 DX2/SP is a bad value or a slow PC—it's actually quite nimble for a 486DX2-66. But as it stands, better-configured and faster Pentiums are available for less.

The IBM is well designed, with an easy-open case and a high-class Lexmark keyboard. Documentation is extensive and thorough. You get one VL bus and two 16-bit slots free, but just one free drive bay. Service is great, with a three-year warranty, a year of on-site service, and 24-hour tech support. This deal is not prohibitive, but systems with better configurations and/or better prices prevail in our ratings. (Note: The $2444 price IBM initially provided for this unit did not reflect a recent $200 price drop.) *IBM, 800/426-2968, 914/766-1900*

Micron 486 Home MPC

PROS: Generous multimedia setup, fax-modem
CONS: Limited expandability, 14-inch monitor, no weekend tech support

Micron's compact 486 Home MPC multimedia system performs well for a DX2-66. This $2229 PC comes with 16MB of RAM, a 1MB integrated local bus graphics adapter, and a 420MB hard drive—but just a 14-inch monitor. You do receive a lot of value when you buy this system: The package includes a fax-modem, a CD-ROM drive, a sound card, speakers, a joystick, Quicken, and Microsoft's Encarta and Works.

You get just one free internal drive bay and three free 16-bit slots (two accept full-length cards). If you want to expand RAM, you'll have to use the four free 30-pin SIMM sockets—both 72-pin sockets are filled. Micron includes a one-year on-site service warranty and weekday toll-free tech support. Micron enjoys the highest reported customer service satisfaction in our Reliability and Service Monitor. This is not a bad little home multimedia system. But the limited expandability and 14-inch monitor put it out of the running for most business buyers. *Micron Computer, 800/223-6571* **Reader service no. 767**

Mitsuba TS30AS

PROS: Rugged case
CONS: Poor battery life, light RAM configuration

Mitsuba is a little-known vendor that sells mostly to VARs and dealers. The design of the TS30AS notebook is serviceable, with a sturdy case, a good keyboard, and a decent trackball. But it's slow for a DX2-66 and has a poor battery life of less than 2.5 hours. The unit sent us had only 4MB of RAM out of a possible 20MB—one reason for the system's poor performance. An additional 4MB would provide significant speedup.

The $2449 vendor-estimated street price is attractive, as are the 325MB hard drive and 10.3-inch dual-scan passive color display. A single PCMCIA Type III slot and built-in audio, speaker, and microphone are nice bonuses. Service policies are undistinguished. We haven't reviewed a product from Mitsuba before, so we can't report a track record. Unfortunately, the modest performance and short battery life keep this system low in our rankings. *Mitsuba, 800/648-7822* **Reader service no. 768**

MPC 799

PROS: Fast performance, intelligent design
CONS: Somewhat limited battery life

This $2999 DX4-100 notebook exemplifies the good values that now often show up in our "Snapshots" section. With 8MB of RAM, a 340MB hard drive, PCMCIA Type II and III slots, and a bright 9.4-inch dual-scan passive color display, it's fast enough to use as a replacement for a typical DX2-66 desktop. Keyboard and trackball are comfortable. But it's a hefty 8.2 pounds, and battery life is just 2.5 hours. MPC provides a one-year warranty and 9-hour weekday tech support (6 hours on Saturdays). Short battery life and so-so support nudge it off our Mobile PCs Top 20, but it's worth considering if you're looking for speed. *MPC Technologies, 800/672-8990* **Reader service no. 769**

NMC Expert System 2

PROS: Good drive expandability
CONS: No weekend tech support, relatively high price

This Pentium-66 minitower has good performance, 8MB of RAM (192MB max), 256K of secondary cache, a 540MB hard drive, and a 15-inch monitor. There are four free drive bays and one PCI and three 16-bit slots free (two accept full-length cards).

Service and support includes a two-year labor, one-year parts warranty; a year of on-site service for $39; and tech support for 9 hours each weekday. As we said, this power system isn't a bad buy. But you can get a similar or better-configured system elsewhere for a budget price. (Note: Like some others this month, National MicroComputers announced a sharp price drop at press time. The company says it will now sell this PC for $2385, which makes it a much more attractive value.) *National MicroComputers, 800/424-2983* **Reader service no. 771**

BATTERY LIFE TEST REPORT

It's a New Record—Compaq Lasts 8½ Hours

Compaq LTE Elite 4/40CX Model 170	8:26
CTX EzNote	5:12
AT&T Globalyst 200 (486SX-33)	4:45
WinBook XP	4:26
Toshiba Satellite T2400CT	3:56
Austin Business Audio 4/100	3:08
AT&T Globalyst 200 (DX4-75)	2:56

Time in hours:minutes.

Methodology
We drain and fully recharge the battery and set power-saving options to match a consistent profile where possible. Office workers type at regular intervals in Word for Windows, saving periodically. Notebooks are rotated among workers to even the workloads. We report the time elapsed until the notebook shuts itself off.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Netis N566 Best

PROS: Fast performance, low price, good expandability
CONS: 14-inch monitor

Here's further proof that the "System Snapshots" section has very good values these days. The $2400 N566 Best tower PC delivers a Pentium-66 with 8MB of RAM (192MB max), a 540MB IDE hard disk, and a 2MB ATI Mach64 64-bit graphics card. The 14-inch monitor helps keep the price down but doesn't match the graphics card's quality. This is actually the quickest Pentium-66 we've ever tested, equaling typical Pentium-90s in overall performance. There are seven free drive bays, three free 16-bit slots, and one free 16-bit or PCI slot. The high fan assembly atop the CPU limits you to adding just two full-length cards.

Netis provides a vanilla support package, with a one-year warranty, a year of on-site service for $79, and tech support 10 hours each weekday and 8 hours on Saturdays. In this case, the unexceptional service keeps this system from a Top 20 berth, but if you're on a tight budget, the N566 Best is a solid, very quick machine for the money. *Netis Technology, 800/577-7526, 408/263-0368.* **Reader service no. 770**

Sharp PC-8660

PROS: Good active-matrix color screen
CONS: No service turnaround policy or weekend tech support, no PCMCIA Type III slot

The crisp charcoal-gray PC-8660 is a nicely constructed notebook with a solid middle-of-the road configuration. For $3999, you get 8MB of RAM (20MB max) and a 320MB hard drive. The 9.4-inch active-matrix color screen is impressive, as it should be: Sharp is a top notebook-screen manufacturer. When we first looked at the PC-8660's benchmarks, we were disturbed by a WordPerfect test result about four times slower than expected and battery life of half an hour. Fortunately, a replacement unit and DOS 6.21's MemMaker memory manager solved both problems: The system recorded good overall DX2-50 performance and a 3.8-hour battery life. Sharp provides just one PCMCIA Type II slot.

The keyboard and mouse are usable enough, although if anything is pressing against the underside of the front-and-center trackball, the mouse buttons don't function properly. Support policies are undistinguished: You get a one-year warranty and weekday tech support, but Sharp does not provide a service-turnaround policy. This is not a bad value, but our Mobile Top 20 has a number of better ones. *Sharp, 800/237-4277* **Reader service no. 772**

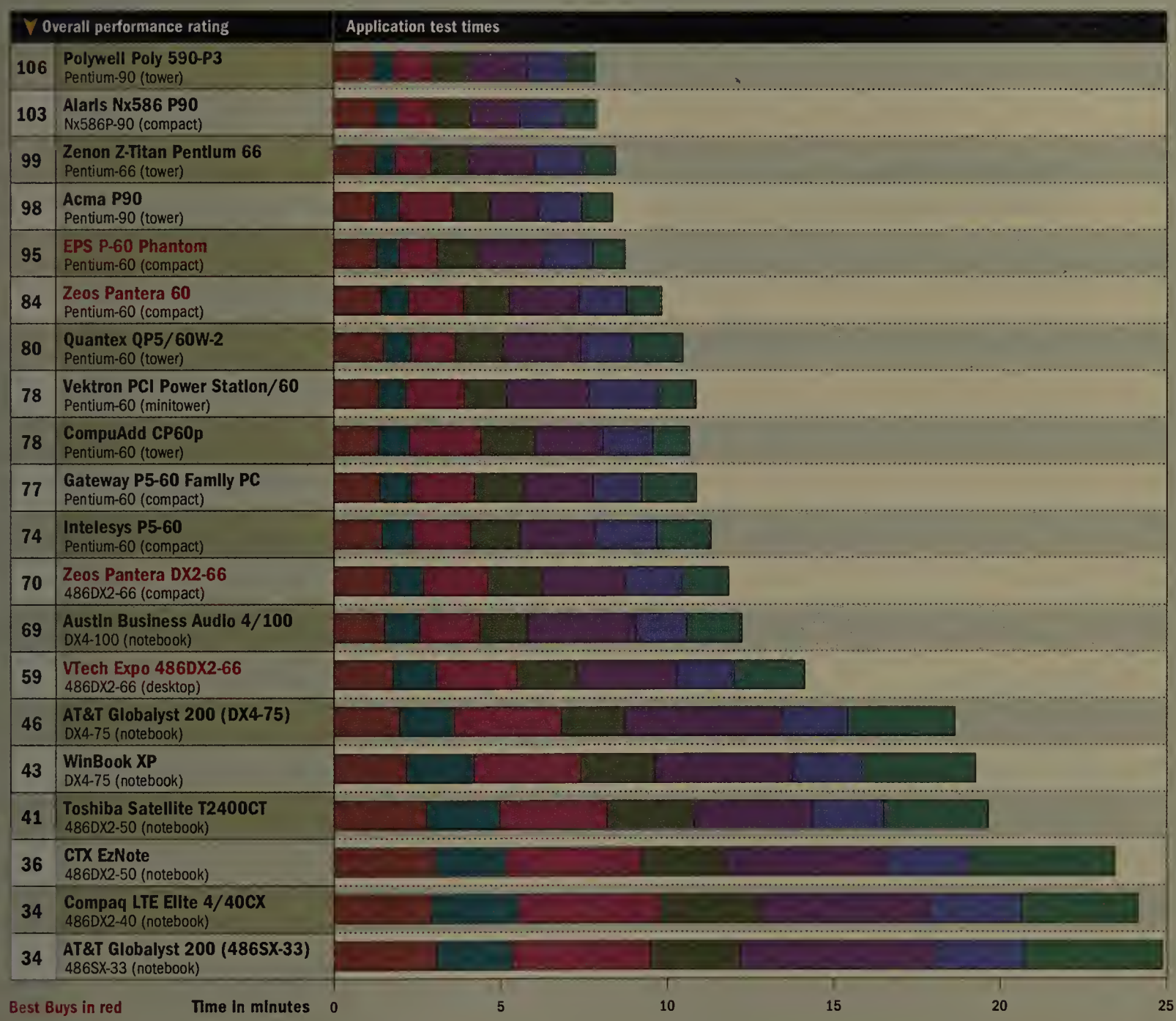
ZDS Z-Note Flex

PROS: Modular and flexible, fast
CONS: No PCMCIA Type III slot

You can snap out and replace every modular part on this fast, flexible DX4-75 power notebook. You can even swap out the floppy drive and drop in a second NiMH battery pack, climbing from an already good battery life of almost 5 hours to somewhere in the 9-hour range. You can also readily upgrade the CPU, the screen, the memory, and the hard drive. ZDS rounds out the notebook with 8MB of RAM (24MB max), a 325MB hard drive, and a clear 10.3-inch dual-scan color screen. The $3992 price—a little high for a passive color model—just nudges this unit into the "Snapshots" section of our review.

The well laid out keyboard has a bit of a spongy touch; the grainy-textured trackball works well. You get 16-bit stereo sound and a built-in microphone, along with sound and voice-recognition utilities, but the integrated speaker is monaural. Service and support is solid. The competition in the power notebook arena grows increasingly tough: This well-designed system would have made our Power Mobile list only a few months ago. *Zenith Data Systems, 800/289-1284* **Reader service no. 773**

Record Notebook Performance for Austin Business Audio DX4-100



Systems are arranged in order of overall performance from best to worst, based on the normalized, weighted scores from seven tests. A system may have a better overall performance rating than another system that took less time to complete our test suite.

Methodology
We tested each system as supplied by the manufacturer, using the version of DOS supplied. If we installed Windows, we used the default installation. We configured Windows with an HP LaserJet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. We set video resolution to 800 by 600 pixels in 256 colors using the supplied video driver where possible. We loaded the test applications and files and test automation software and scripts.

Word 2.0 for Windows
We worked with 1-, 9-, and 28-page business documents. Operations included creating, saving, opening, scrolling, editing, checking spelling, formatting, previewing, and printing.

Excel 4.0
We opened a file and performed several data extracts, entered new data, altered calculations, formatted, scrolled, moved blocks, previewed, printed, and saved.

Paradox 1.0 for Windows
We used a custom form to add a moderate number of records to an existing table, performed several queries, and generated a report.

Freelance 1.0 for Windows
We built a six-page presentation using a standard template, clip art, text, and charts; applied several views to the presentation; and previewed and saved it.

WordPerfect 6.0 for DOS
We performed a variety of editing, formatting, previewing, and printing tasks on documents ranging from a single-page memo to a long report. Due to memory requirements, the amount of free memory for DOS in the first 640K dramatically affects this test.

1-2-3 release 3.4 for DOS
Using the graphical Wysiwyg add-in and working in three different files, we created and altered formulas, built graphs, saved, and printed.

Paradox 3.5 for DOS
We tested Paradox 3.5 running under Windows in a DOS window. We entered data, searched records, updated, and generated reports from a simple customer list.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

WHAT HAPPENS

WHEN YOU ADD SIZE

TO AN ALREADY

EXTRAORDINARY PACKAGE?

WHAT DO YOU THINK?

At 7 feet 2 inches tall, Kareem Abdul-Jabbar has got some serious size. But that's only half the story. The fact that he added superior basketball skills to an already imposing frame is what made him a dominant force in the NBA for two solid decades.

The new ergonomically and aesthetically designed Elite series of monitors from MAG Innovision have features that other monitors just can't touch. And the fact that they only come in the larger 15-inch, 17-inch and 21-inch sizes with the most advanced CRT technologies makes them truly fantastic. Advance Display Calibration, Green Energy and LCD displays combined with ultra high resolutions up to 1600 x 1280, lightening-quick refresh rates and crystal clear dot pitches make them impossible to beat. And since they're so reliable, we'll even throw in a 3-year limited warranty.

So pick one up at a MAG InnoVision dealer near you. Their larger size and imposing features are liable to dominate the market for years to come and they cost a lot less than, say, an NBA draft pick these days.

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Top 10 Windows Accelerators: VidTech Challenges ATI

Winter may be coming, but our Graphics Boards Top 10 is heating up. Even as a new round of price cuts shook up our rankings, tiny VidTech Microsystems nearly knocked graphics giant ATI off the top of the chart with its FastMax P20 board. In fact, only a $25 price cut on ATI's top-rated Graphics Xpression board prevented the FastMax P20 from grabbing the top spot.

Built on the S3 Vision864 graphics chip, the PCI-based FastMax P20 recorded a scorching 76.1 overall score on *PC World*'s Windows Integrated Test Suite (WITS), and joined the ATI Graphics Xpression at the top of our chart with a healthy lead over other contenders. The 2MB FastMax boasts a low $189 street price and the fastest DRAM-based performance we've ever seen, outpacing that of the Hercules Dynamite Power PCI.

Tiny VidTech has nearly knocked giant ATI off the top of the chart.

The FastMax P20 is not without flaws: Its software and installation lack the sophistication of the Number Nine, ATI, and Diamond boards. And we found a minor bug in the bundled graphics-viewing utility—graphics hounds and desktop publishers will want to look elsewhere. Still, the P20 offers impressive mainstream performance, toll-free technical support, and a five-year warranty.

Two boards not on the chart are worth mentioning. VidTech's PCI-based GraphMax P24 aims high with 4MB of fast VRAM and an S3 Vision964 chip. Although it achieved a 75.4 overall WITS score, its $535 street price kept it off our Top 10 (a 2MB version costs about $350). Graphics pros will enjoy high refresh rates at all resolutions and color settings, thanks to the P24's fast 220-MHz digital-to-analog converter; a VESA Advanced Feature Connector allows hookups to full-motion video cards and other peripherals.

We also tested the VL and PCI versions of Miro Computer Products' $395 miroCrystal 20SV. Based on the same S3 Vision964 chip found on Top 10 boards Number Nine #9GXE64 Pro and Diamond Stealth 64, the PCI version of the 20SV turned in a 73.1 overall WITS score—well behind the 78.8 mark set by the #9GXE64 Pro. The VL version trailed with a score of 68.5. Both boards include basic Windows software for changing colors and resolutions, setting monitor color temperatures, and performing other functions.

WITS was developed by Jon Peddie Associates, a consulting firm specializing in PC graphics technology. Jon Peddie and Fred Dunn are the principal officers of Jon Peddie Associates.

TOP 10 ACCELERATORS

New this month
Up from last month
No change from last month
Down from last month

		Overall value	Estimated street price	Windows Integrated Test Suite scores: Word 2.0 for Windows	Excel 4.0 for Windows	CorelDraw 3.0	PhotoStyler 1.1	QuarkXPress 3.11	Freelance Graphics 2.01	Overall WITS score	RAM (MB/type)[1] Bus type	Chip/ driver date	Reader service number
1	ATI Graphics Xpression 905/882-2600	94	$225	13.4	16.6	13.2	11.6	15.6	4.8	75.1	2 / D PCI	88800CX 4/11/94	870
2	VidTech FastMax P20 800/752-8033	94	$189	13.1	16.2	13.4	11.5	15.3	6.6	76.1	2 / D PCI	Vision864 6/1/94	871
3	STB Powergraph Pro PCI 800/234-4334	92	$239	12.8	15.6	12.2	11.7	14.6	6.6	73.4	2 / D PCI	Vision864 5/9/94	872
4	STB LightSpeed 800/234-4334	92	$199	12.5	14.5	12.6	11.4	14.7	5.9	71.5	2 / D VL	ET4000/W32p 4/10/94	873
5	Hercules Dynamite Power PCI[2] 800/532-0600	91	$199	13.2	15.2	13.3	12.8	15.3	5.7	75.5	2 / D PCI	ET4000/W32p 5/11/94	874
6	Diamond Stealth 32[2] 800/380-0030	91	$249	13.6	15.5	13.3	11.5	12.2	6.0	72.2	2 / D PCI	ET4000/W32p 12/29/93	875
7	Diamond Stealth 64[2] 800/380-0030	90	$315	13.5	17.9	13.1	11.2	12.9	8.5	77.1	2 / V VL	Vision964 4/1/94	876
8	Number Nine #9GXE64 800/438-6463	90	$249	12.8	14.7	10.3	11.5	14.3	6.5	70.1	2 / D PCI	Vision864 4/26/94	877
9	Number Nine #9GXE64 Pro 800/438-6463	90	$356	13.7	16.8	12.9	11.9	15.6	8.0	78.8	2 / V PCI	Vision964 4/26/94	878
10	Boca Voyager 407/997-6227	90	$145	12.6	13.8	12.8	11.6	14.1	4.6	69.4	1 / D VL	F64300 3/22/94	879

Methodology Boards were tested at 1024-by-768-pixel resolution at 256 colors and a minimum 70-Hz refresh rate on a 486DX2-66 with 16MB of RAM and 256K of secondary cache. Application scores are the factor by which a board exceeds our baseline system, an unaccelerated ET4000-based VGA adapter on a 386DX-25 with 16MB of RAM. The overall value score balances performance, estimated street price, and features. The overall WITS score is the aggregate of the application scores. For all scores, higher is better.

[1] D = DRAM, V = VRAM.
[2] Comparable value offered by other bus versions tested.

For more information about all products in this table, circle reader service no. 908.

RELIABILITY AND SERVICE MONITOR

Win a Quantex QP5/90B-2

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a Quantex Microsystems QP5/90B-2, a Best Buy featured in this month's PC World Top 20.

HOW TO ENTER: Fax your completed questionnaire to *PC World* at 415/974-7367. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Fax Survey, Box 12-SS, *PC World*, 501 Second St. #600, San Francisco, CA 94107-1496. Send your survey in no later than December 31.

HOW TO FILL OUT THE FORM: Clearly print your name (use block capital letters) and your fax number at right; fill the appropriate circle for each digit of your daytime phone number. Then fill out the rest of the questionnaire. WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES! One entry per person per month. Void where prohibited by law.

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer ○ Acma ○ ALR ○ Apple ○ Ares (MI) ○ AST ○ AT&T (NCR) ○ Austin ○ Blackship ○ Canon ○ Compaq ○ CompuAdd
○ Compudyne ○ Comtrade ○ Cornell ○ CTX ○ DEC (Digital) ○ Dell ○ Diamond ○ DTK ○ Eltech ○ EPS ○ Epson ○ Everex
○ Future Tech ○ Gateway 2000 ○ Hewlett-Packard ○ Hyundai ○ IBM ○ Insight ○ Intelesys ○ Leading Edge ○ Micro Express ○ Micron ○ Midwest Micro ○ MIS
○ Mitac ○ NEC ○ Netis ○ Packard Bell ○ Panasonic ○ Pionex ○ Polywell ○ Quantex ○ Samsung ○ Sharp ○ Swan ○ Tandy
○ Tangent ○ Texas Instruments ○ Toshiba ○ Tri-Star ○ Twinhead ○ USA Flex ○ VTech (Expotech, Laser) ○ Zenith (ZDS) ○ Zeos ○ Other

Is this PC a...?
○ Desktop
○ Notebook/laptop
○ Hand-held

Is the CPU a...?
○ PowerPC
○ Pentium
○ 80486
○ 80386
○ Other

Where did you buy this PC?
○ Local dealer
○ Mail/phone order
○ Direct from field sales force
○ Membership discount store
○ Computer superstore
○ Home electronics store
○ Retail store
○ VAR
○ Other

After ordering, how long did it take to get your PC?
○ Less than 1 week
○ 1–2 weeks
○ 3–4 weeks
○ More than 4 weeks

Who set up your PC?
○ Dealer/retailer/VAR
○ Staff computer technician
○ Self or co-worker

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 89 ○ 90 ○ 91 ○ 92 ○ 93 ○ 94

When you first set up your PC, were any components "dead on arrival" (DOA)?
○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive
○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory
○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse
○ Power supply ○ Sound board ○ Other

Did your problem occur only after adding your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ One ○ Two ○ Three ○ Four ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the section at right. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

Please answer for the most recent problem—*other than DOA*—not reported in a previous survey.

When did this problem occur? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 89 ○ 90 ○ 91 ○ 92 ○ 93 ○ 94

How long was this after you purchased your PC?
○ Less than 1 month ○ 1–3 months ○ 4–6 months ○ 7–12 months ○ More than 12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Incorrectly installed software ○ Wrong configuration ○ Faulty peripheral ○ Device conflicts ○ OS problem ○ Other ○ Don't know

If a component failed, which one was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive
○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory
○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse
○ Power supply ○ Sound board ○ Other

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?
○ Manufacturer
○ Dealer/store where purchased
○ Manufacturer's authorized repair technician
○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ On site ○ In store ○ System swap ○ Component swap ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ Less than 1 minute ○ 1–2 minutes ○ 3–5 minutes ○ 6–10 minutes ○ 11–20 minutes ○ More than 20 minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 minutes ○ 15 minutes–1 hour ○ 2–5 hours ○ 6–10 hours ○ 11–24 hours ○ 1½–2 days ○ 3–5 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1–2 days ○ 3–7 days ○ 1½–4 weeks ○ More than 1 month ○ Never resolved ○ Awaiting resolution

Was the problem resolved to your satisfaction?
○ Yes ○ No

How would you rate the person(s) who helped you?

	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?
○ Not at all ○ ○ Satisfied ○ ○ Extremely satisfied

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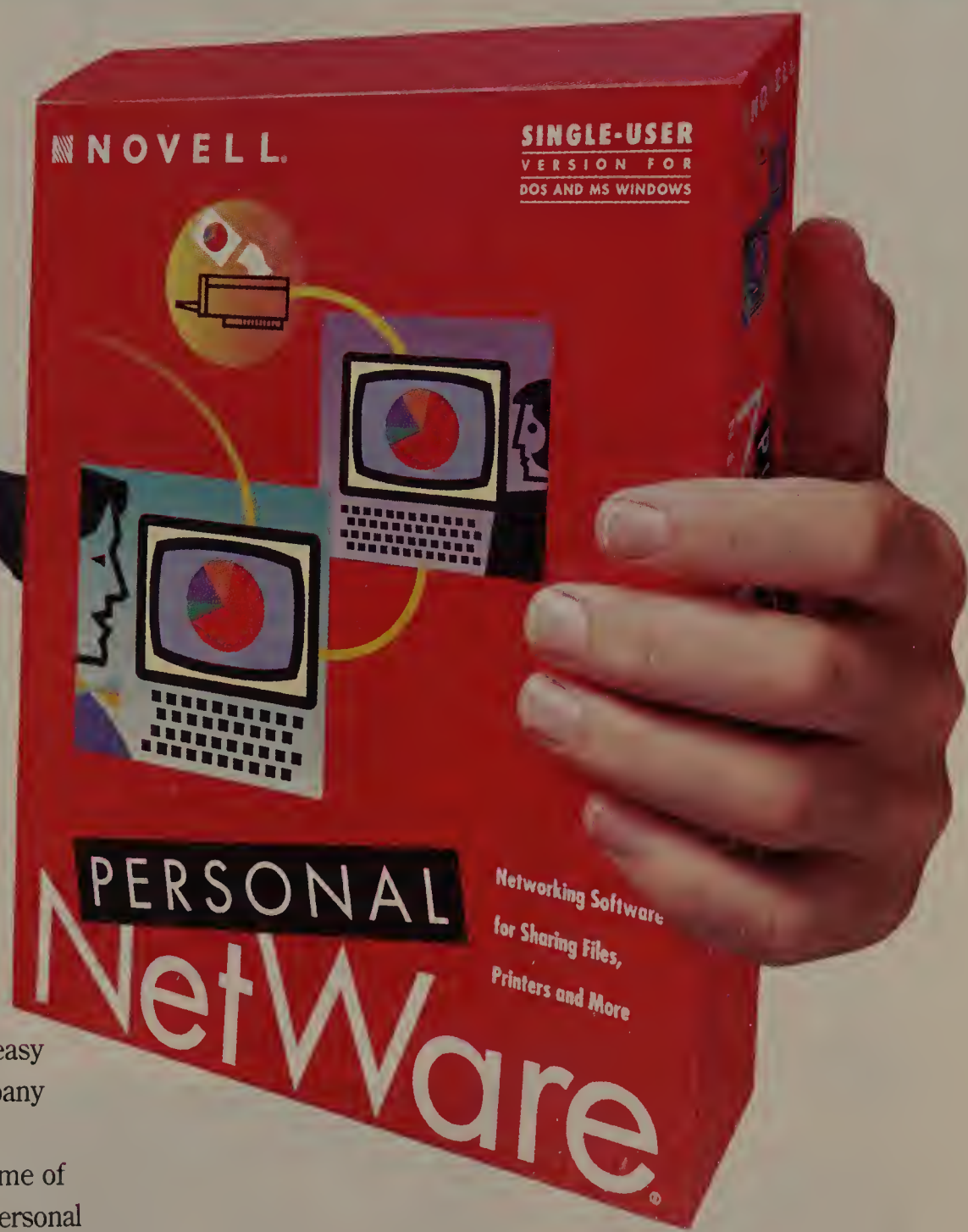

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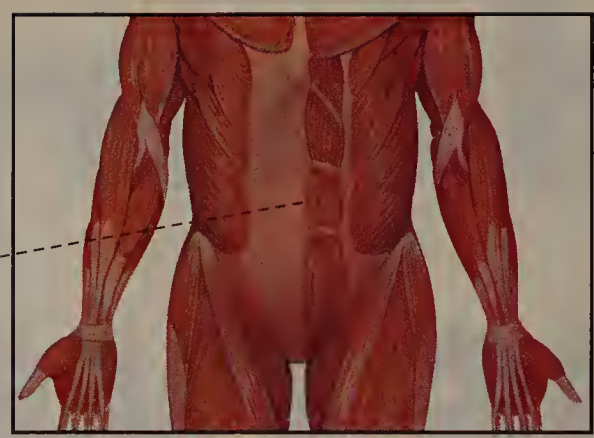
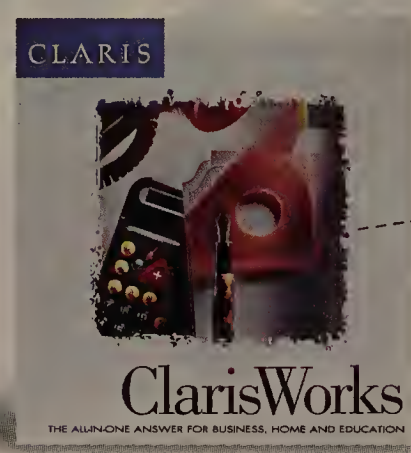


Guts.



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Small Office Home Office

FROM HIGH-RISE TO HOME: HOW TO SET UP A SMALL OFFICE THAT WORKS.

PC WORLD
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Edited by Steve Fox

How to Succeed in Business

PHIL ANDERSON

Thinking about flying the corporate coop and starting your own business? Here's what it takes if you want—or need—to be your own boss.

BY BRONWYN FRYER

SOONER OR LATER, JUST ABOUT EVERYone who works for someone else is tempted to dump the corporate rat-race and make a go of it alone. Why not? As a nation raised on the notion of pulling ourselves up by our own bootstraps, we worship the idea of the self-made man or woman. Start-up stars like Microsoft's Bill Gates, The Body Shop's Anita Roddick, or Southwest Airlines' Herb Kellaher are more than just role models—they're late-twentieth-century heroes.

Even if we're not inclined toward hero worship, many of us are being forced to consider self-employment. That's because the days of secure, lifelong jobs are going the way of the pterodactyl. In an effort to "downsize" and "restructure," companies are replacing full-timers with self-employed consultants who don't demand expensive health coverage or retirement benefits.

Whether a career change is willed from within or accepted from without, anyone hoping to stay gainfully employed through the nineties and beyond should be thinking about polishing those entrepreneurial skills. "Achieving the mind-set of an independent

contractor while you're working as someone's employee is a win-win proposition," says business guru Tom Peters, author of *In Search of Excellence*. "If you're on a payroll, such a mind-set increases the chances of staying on it. If you leave your job, it increases the odds of landing on your feet."

Ingredients for Success

UNFORTUNATELY, NOT EVERYONE IS CUT out for solo flight. Although the number of small businesses is growing more than 50 percent annually, nearly 80 percent of new businesses fail, according to the Small Business Administration (SBA). Business analysts generally cite inadequate financing, poor management practices, and ineffective marketing techniques as the culprits. Organizational psychologists, however, believe that the real problems lie elsewhere. Examine any small-business failure, they claim, and you'll find that the entrepreneur lacked at least one of the following four critical ingredients: A business focus consistent with personal strengths, self-discipline, a passion for the job, and an overriding commitment to satisfying customer needs.

Among these, knowing what you do well is ingredient number one. "Instead of considering what they are really good at, most people look at the lists that tell them where the 'hot' jobs are," Peters groans. "This is the opposite of the appropriate approach."

Self-discipline is fundamental, too: "There are times when you don't feel like calling on a customer, confronting rejection, or even getting up in the morning," says Marsha Sinetar, author of *Do What You Love, The Money Will Follow: Discovering Your Right Livelihood* (Dell Books, New York, 1989). "But successful entrepreneurs are like good athletes: They have what it takes to see the task through when the chips are down."

And part of what drives them is a love of what they do. Passionate businesspeople are natural marketers; their enthusiasm is infectious. "You cannot succeed in business over the long haul if you are a negative thinker," says Sinetar. To get customers and give them confidence in your abilities, it helps to exude excitement—even joy—in your work.

The final ingredients for entrepreneurial success: a lightning-fast response to clients' needs and an ability to deliver an excellent product or service. Betsy Collard, director of programs at the Career Action Center, a career management organization in Palo Alto, California, cites "the ability to turn on a dime, to make things happen and deliver quality."

On Your Mark, Get Set...

IF YOU'RE ALREADY BLESSED WITH THESE qualities, have a great idea, and know it's high time you climbed out from under the 9-to-5 yoke, the next step is to plan your escape. During the year prior to handing in your resignation, put your entrepreneurial house in order by doing the following:

SHIFT CONSCIOUSNESS. Start changing the way you approach work, experts advise. "Begin volunteering to do tasks where you need to garner experience, and offer to take on bigger projects," suggests Peters. Your current employer will begin to see you as a more valuable player, which will increase the odds that the company will seek your services once you go solo.

STUDY UP. While you are planning your departure, ferret out information that you will have a harder time finding once you're out on your own. "Watch vendors who are calling on your company offering their services, and look at proposals that come in," recommends Collard. "Observe who gets hired, and why." Also, take advantage of

CORPORATE ESCAPEE: ERIC COLLIER

BUSINESS: Bottomline Solutions, an organizational consulting firm, Chevy Chase, Maryland

HISTORY: Collier graduated from college on a Friday in 1969. The following Monday he started a job at IBM, where he stayed for 21 years, rising steadily through the ranks. Though happily employed, he dreamed of striking out on his own. When IBM offered a generous early retirement package in 1990, Collier—by then a top executive with a six-figure salary—jumped at the opportunity. To make the transition easier, he continued to work for IBM part-time until BottomLine Solutions—the organizational consulting company he founded with another former IBM executive—was up and running.

WHAT HE LEARNED: "Starting my own business was a lot easier than I thought it would be. If you trust yourself and are willing to take the risks, you'll be rewarded."

PROGRESS REPORT: "I never felt so excited about my work as I do now. At IBM we knew what would be happening in a year. With my business, I have no idea what will happen in six months. It's as exhilarating as riding a roller coaster."

EQUIPMENT: Store-built 386 PC clone (not an IBM!) from DPM Group, fax-modem, Epson laser printer, two phone lines.

—LESLIE CRAWFORD

KATHERINE LAMBERT

your current corporate tenure to read as many books as you can about starting your business: Visit your local business library, Chamber of Commerce, Small Business Development Center, and U.S. Small Business Administration office, or call the SBA at 800/827-5722 for information.

DEVELOP A BUSINESS PLAN. Whether your expenses will comprise as little as a telephone line and a set of pencils or as much as a rented office suite with a cork ceiling and a bank of PCs, a business plan is your primary requirement. A business plan puts into concrete terms the vision you've been carrying around in your head. The plan should include an analysis of the kind of business you'll be operating, a description of the market and the competition, the resources you'll need, and the direction and proposed speed of your company's growth. In addition to forcing you to think realistically about your enterprise, a business plan helps you secure financing and credit, and attract partners.

Several software products can help the would-be entrepreneur create and develop a business plan. Packages ranging from First Step Business Plan (a $5 package from the National Business Association, 800/456-0440) to Plan Write ($130 from Business Resource Software, 800/423-1228) can help you answer the hard questions and organize your ideas.

RUB ELBOWS. Even if you are keeping your move secret from everyone, including your cat, remember that each person you meet is a potential client or source of business. To that end, join professional organizations and attend meetings. Also, find other independent contractors who can serve as a support group once you're out on your own.

MANAGE YOUR MONEY. As Salli Rasberry, author of *Running a One-Person Business* (Ten Speed Press, Berkeley, 1994), points out, "You can't give your best energy to your business if you're worried about feeding your family." So trim your debt and stow away six months' pay—or as much as possible—before leaving the corporate nest. If yours is an invoice-based business, protect yourself against any cash flow logjams by establishing a business credit line. To protect personal assets, you can incorporate, setting up your business as a separate entity. While you'll have to hire a lawyer and fork over around $1000 for the paperwork, your assets can't be touched if the business fails.

GOING COLD TURKEY: AMELIA BLAND

BUSINESS: Dispute Alternatives, a law and dispute-mediation firm, Marion, Virginia

HISTORY: Attorney Bland had it all—a plum job at a prestigious law firm with a fixed salary, a 401K, a medical insurance plan, paid vacations, and a profit-sharing plan to boot. Then a year ago she made the radical decision to exchange security and perks for the chance to pursue her passion: mediation.

WHAT SHE LEARNED: "I was too cautious about overhead, so I went without an administrative assistant for too long. Now that I have one, she's paid for herself five times over."

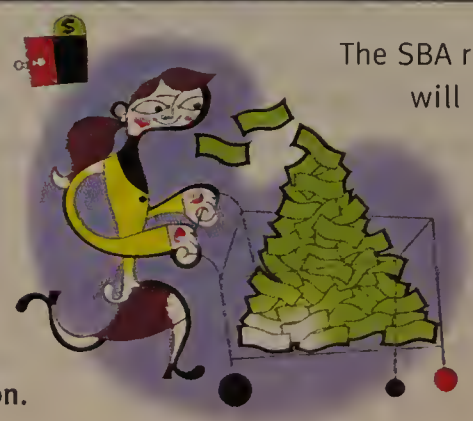
PROGRESS REPORT: "Going off on my own was a quality-of-life decision. I remember waking up nights with my heart pounding because of having to account for something at work. Now I have to account only for myself." At last report, her small business was thriving and she was able to spend more time with her two children.

EQUIPMENT: Apple PowerBook 140, Macintosh Performa 400 and 410 computers, StyleWriter and Personal LaserWriter printers; Canon copy machine; two phone lines. —L. C.

LOANS FOR LONERS

If you're counting on receiving a small business loan to get started, don't get your hopes up. The savings and loan bailout and the credit squeeze following the 1991 FDIC Improvement Act have put a distinct chill on small-business lending.

Nevertheless, there are a few sources of funding for small businesses, many of which can be found through the **Small Business Administration.**



The SBA rarely makes direct loans to individuals, but it will guarantee business loans made by local banks and other lenders. For women-owned businesses, borrowers can turn to the **National Association of Women's Business Advocates** (through the Ohio Department of Development in Columbus) and the **Office of Women's Business Ownership** (Washington, D.C.).

ILLUSTRATION: PHIL ANDERSON PHOTOGRAPH: STEPHEN ALVAREZ

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At the same time, meet with an accountant to get a foothold on the financial side of the business. Once on your own, you'll have to file taxes quarterly, so good advice is critical. The best way to find a good accountant is to ask acquaintances with small businesses to recommend one; short of that, check the phone book for accountants who service small businesses. To hold up your end of the accounting line, buy a good accounting package, such as Intuit's QuickBooks or Peachtree's Accounting for Windows.

DON'T OVERSPEND. The most common mistake start-up business owners make is to go crazy buying fancy office equipment and furniture. "We all think a business means a high-rise, glass-walled office with leather chairs and original art," says Rasberry. "But if you've spent $10,000 to open a shop and the phone doesn't ring, you're in trouble."

Instead of adding costs, think about cutting them: Don't rent an outside office or buy anything that isn't absolutely necessary. And don't even think about hiring anyone until you have more work than you can handle. At the same time, do spend money on the equipment your customers will expect you to have: If you're opening a hair salon, one hair dryer and a sink won't cut it.

DETAILS, DETAILS. If possible, set up your office and order business cards, checks, stationery, an answering service, hardware, and other tools of your trade during the month prior to your departure. Also, visit your county government office to apply for a business license. Finally, prepare a letter to be sent to everyone in your Rolodex, complete with a description of your services and a business card, and post it the day after you bid farewell to your employer.

DON'T BURN BRIDGES. You may want to keep your company as a future customer, so do things legally. If you make copies of samples or other items to take with you, make sure the material is not proprietary, and make the copies after hours and on your own dime. Last but not least, give sufficient notice for your employer to replace you conveniently.

Death and Taxes

TA-DA. YOU'RE OPEN FOR BUSINESS, AND THE phones are ringing. After a few months, you begin to see those checks roll in, often in nice round figures. Time to go on a spending spree at Nordstrom? Definitely not.

Sadly, the new, powerful feeling a check brings is as fleeting as an April 15th breeze. All the things you took for granted in corporate life are gone. No more health or life insurance. No more profit-sharing plan. No more automatic tax withholding. In their place: A stack of invoices, hungry for your fat check. Welcome to the wonderful world of self-employment. Here are tips for dealing with the discomfort of start-up distress:

THINK THIN. Taxes are among the most depressing certainties of the entrepreneurial life. And as if income taxes weren't dreary enough, self-employed people are broadsided by an additional, whopping 15.2 percent self-employment tax, plus local taxes, licensing fees, and sales taxes. Throw in the costs of running computers or fax machines, making long-distance phone calls, and purchasing supplies and professional subscriptions, and you're lucky to have beans to eat.

So it's best to start liking beans right off the bat. In fact, plan on keeping only half of that check. Be prepared to part with the rest—yep, that's 50 cents on the dollar—putting it in an escrow account to cover

PLAYING IT HALFWAY: MICHAEL PAULSEN

BUSINESS: Scram!, a boys' clothing line, Hollywood, California

HISTORY: Paulsen worked as national promotion manager for Swatch in New York City and later as a marketing consultant for clients such as Reebok and Pepsi. After dreaming for two years of starting his own clothing line, Paulsen began spending long evenings in coffee shops, drafting his business plan. Weekends he'd canvas the local stores, polling customers on what they'd like in boys' clothing. He recently started his own company, Scram!

WHAT HE LEARNED: "It's expensive and stressful to start your own business. There are sacrifices to make—like giving up my house and moving into a less-expensive loft."

PROGRESS REPORT: "I've always done new product launches for other companies' products. For once I wanted to do one myself." Confident about his company's future, Paulsen recently hired a secretary, a design consultant, and a marketing assistant. Even so, Paulsen continues to moonlight as a part-time consultant for Reebok, Pepsi, and other clients he cultivated in his pre-Scram! days. Whatever the outcome of his venture, Paulsen remains a relentless optimist: "The worst thing that can happen is I'll say, 'Hey, at least I tried.' "

EQUIPMENT: Apple PowerBook 160, Macintosh LC, and Personal LaserWriter printer; Sharp fax machine; one phone line. —L. C.

GARY MOSS

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taxes, insurance, and other costs. And as long as you're putting money aside, here's a good bit of news: You can establish a Keogh account to shelter up to 15 percent of your income; you don't pay taxes on it until you retire (and have presumably relocated to a lower tax bracket). Most important, try to build these costs into your fees without driving yourself out of the market.

GET INSURED. Maybe someday universal health coverage will be a reality. Meanwhile, if you're married and your spouse works for a company that offers health insurance, you'll generally get the best deal there. Otherwise, find a good insurance plan before you leave. (Many states require employers to offer workers the option of retaining their group plan coverage for a specified period of time after leaving the company. But beware. These plans are often pricier than insurance you can locate on your own.) Medical insurance can cost $40 and up per month, depending on age and sex. If you include doctor visits, plan on spending $120 to $250 a month. Less expensive group plans are often available through alumni associations and other professional organizations.

And don't rule out other types of coverage. For example, if you're concerned for your family's well-being, go in for life insurance. It will run from $10 to $600 per month (depending on whether it's an investment) but will keep the wolf from your family's door should the worst happen to you.

Also, consider an umbrella insurance policy for your business to bail you out in the case of unforeseen circumstances—for example, to help cover legal fees in case you're hit with a lawsuit. And what happens if your back goes out, you fall off a roof, or some other mishap conspires to keep you out of work? For around $200 per year, you can purchase State Disability Insurance through your local employment development office (insurance providers will sell you additional disability insurance for a monthly fee of around $20 and up, depending on your age).

KEEP THE CASH FLOWING. While having $15,000 in outstanding billings sounds good, it just ain't the same as cash in the bank. For that reason, structure your fee schedule so clients pay a little at a time instead of all at once. For example, if a client owes $5000, ask to be paid $1000 per month over a five-month period. If you have money coming in all the time, you'll enjoy a steadier cash flow. Finally, keep track of the work you do. Invoice for any services immediately upon completion, keep copies of all invoices, and keep your accounting records up to date. (If you're allergic to accounting and easily lose track of what people owe you, you're probably not suited to entrepreneurship.)

FIND SUPPORT. Be prepared for tough times, especially when the cash flow slows to a trickle. "Find other self-employed people with whom you can have lunch once a week," says Rasberry. "Ask your entrepreneurial colleagues to help you take one step at a time; talk about the two things you got done last week and the two things you'll accomplish next week." Sooner or later, the mountains will begin to look like molehills.

BACK TO THE FOLD: RICK MERCER

BUSINESS: Career Sports International, sports marketing firm, Atlanta, Georgia

HISTORY: Thirty-two-year-old Mercer spent four years with Advantage International, a sports marketing firm in Washington, D.C. Ready for a change and confident of the contacts he had made, Mercer leased a small office, hired a secretary, and founded Athlete and Special Event Marketing. His gig as a free agent lasted two years before he returned to the corporate fold. That's because he got an offer he couldn't pass up: Working for Golden Bear International—Jack Nicklaus's 125-person corporation. As is par for the course in the corporate arena, one good offer leads to another. Mercer recently accepted a position as vice president of marketing at Career Sports International in Atlanta.

WHAT HE LEARNED: "It's tough being on your own. I spent more time taking care of administrative details than getting new clients."

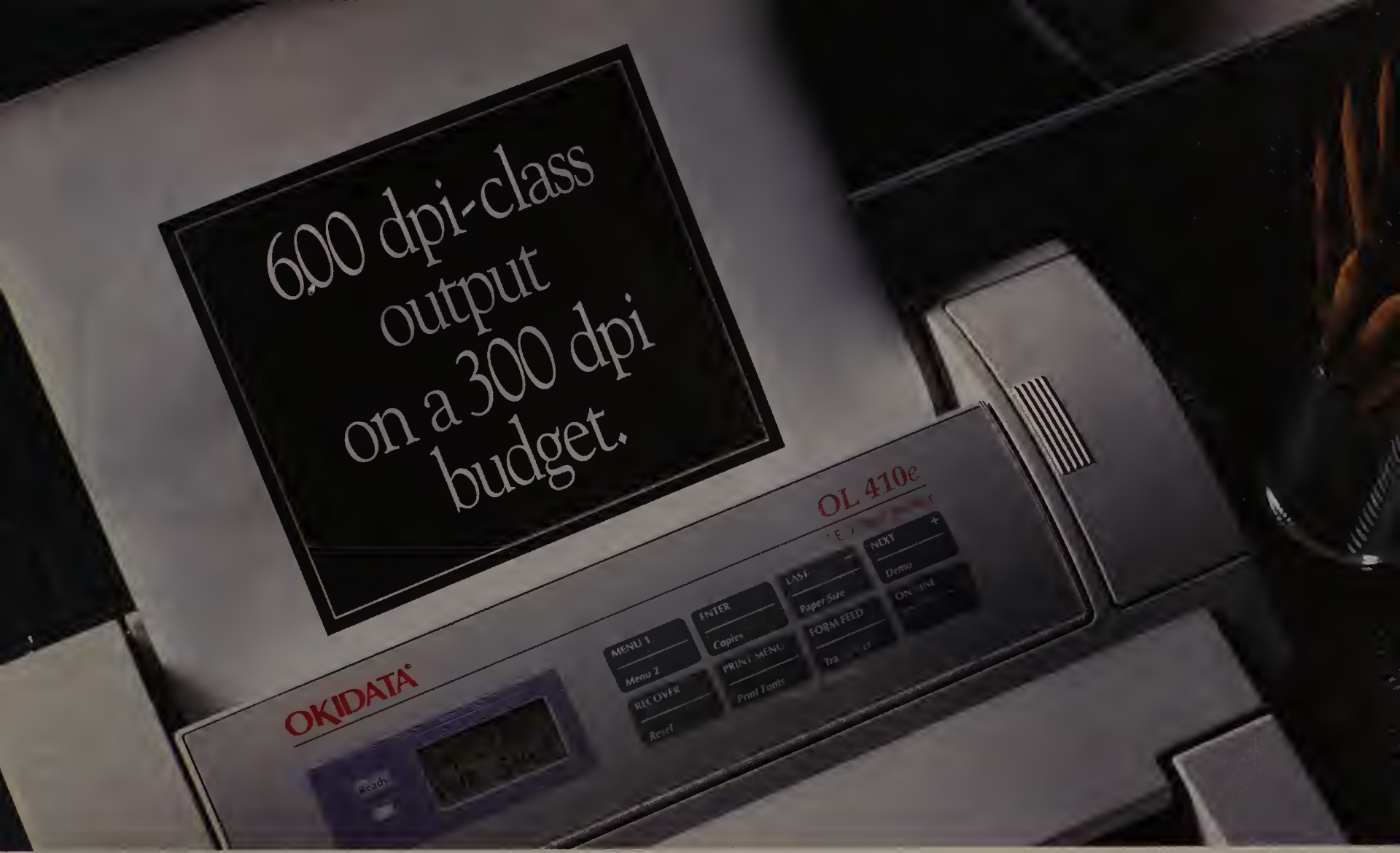
PROGRESS REPORT: "It was great having the whole check go to me. But the administrative support I get in the corporate world makes life a lot easier. Plus, having a high-profile position has allowed me to make contacts that have been great for my career." —L. C.

On Your Own

WHILE THE DEMANDS OF A START-UP BUSINESS are great, those who have made a go of it insist the rewards are worth it. And you don't have to be on the cover of *Fortune* to be recognized as a success. "Our culture loves the instant big win and the smashing success, but that's not what really makes a small business thrive," says Sinetar. "To flourish, a small-business owner needs an ability to take care of the details, to stick to the task until it's done, and to listen to customers. Once you're disciplined enough in the basics and have the intuitive grace to move beyond these," she notes, "you can find your own upper echelon of success."

Bronwyn Fryer is a contributing editor for PC World. Leslie Crawford is a San Francisco–based writer.

DAVID CARTER



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Both the OL410e and the OL410e/PS with Adobe® PostScript™ are designed for laser-class output, so you can produce great looking sales presentations, newsletters and direct mail flyers easily and affordably.

The LED printhead carries a 5 year limited warranty, and the print speed is a fast 4 pages-per-minute.

And after 20 years and 7 million printers, we think it's safe to say you'll never find better looking output at a better looking price: the OL410e is about $700,* the OL410e/PS is under $1,000.**

Call 1-800-OKI-TEAM, ext. 540 (U.S. or Canada) for a dealer near you.

FREE SOFTWARE IF YOU ACT NOW!

Choose one of these WordPerfect® Main Street™ programs (worth up to $139†) with the purchase of an OL410e or OL410e/PS. Offer good from Oct. 1, 1994 to Dec. 31, 1994.

The OKIDATA

OL410e and 410e/PS Personal Printers.

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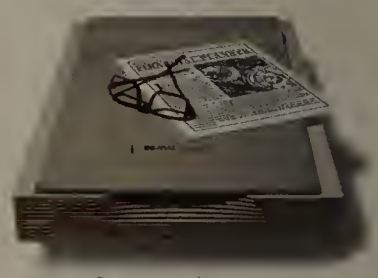
Circle 199 on reader service card

If you can picture it, you can scan it.

The New HP ScanJet Scanners

Just click. That's all. If you can do that, HP ScanJet scanners will do the rest. Photos, illustrations, text, napkin scrawls: all easily incorporated into your document. The new HP ScanJet 3p is a grayscale scanner, offering 1200-dpi enhanced resolution (300-dpi optical) and new software that makes everything automatic. The HP ScanJet IIcx boasts 24-bit color at 1600-dpi enhanced resolution (400-dpi optical) and now includes Calera WordScan OCR software. Both carry HP reliability and support. Neither carries an unreasonable price. For more information or for the name of your local dealer, call 1-800-SCANJET, Ext. 8825.

Black & White – $599



Color – $1,179

The easiest thing you'll do all day.

HEWLETT® PACKARD

*Suggested U.S. list prices. ©1994 Hewlett Packard Company PE12424

Top Picks for the Home Office

These are a few of our favorite things. BY STEVE BASS

The Omnifax G5 scanner is the all-in-one survival tool for the home office.

ROBERT CARDIN

INTERESTED IN A $50 SOFTWARE UTILITY that diagnoses Windows' ills and fixes them? How about an all-in-one plain-paper fax machine, copier, printer, scanner, and fax-modem? Or a notebook that outperforms your desktop system? Read on: Here are some hot products that will save you time and hard-earned bucks.

Swiss Army Fax Machine

IT'S A PLAIN-PAPER FAX MACHINE. NO, WAIT, it's a scanner with optical character recognition. Hold on, it's also a 300-dots-per-inch printer with a 120-sheet paper tray. The Omnifax G5 is all that plus a copier and a 14.4-kilobits-per-second fax board. The remarkable Omnifax prints, scans, sends, and receives documents on its built-in fax board. The printer generates 7 pages per minute, features PCL 4 emulation, has a 1MB printer buffer, and contains three resident fonts. The Omnifax won't fit in your pocket like a Swiss army knife, but it has a small footprint: Not including trays, it's a little less than 4 inches high and takes up as much desk space as a phone book. Okay, at two grand the unit isn't cheap. But just imagine how much you'd spend if you bought each component separately. Omnifax G5 $1995; Danka/Omnifax; 800/221-8330. **Reader service no. 732**

Learning to Articulate

WHAT TILTS UP AND DOWN, MOVES LEFT and right, and drops out of sight at a moment's notice? If you guessed your brother-in-law, well, you may be right. But I was describing an under-the-desk articulated keyboard arm. Besides getting the keyboard off your desk (and retrieving precious desktop real estate), Waterloo Furniture's versatile, sturdy keyboard arm does an amazing job of adjusting to your environment. You can raise and lower the keyboard arm within 6 inches and tilt it within a 15-degree range. It clamps onto your keyboard and glides under the desktop when not in use. The keyboard tray mounts onto the arm and, for even less desk clutter, includes a handy mouse tray. 6130 Storable Keyboard Arm $103, 6221D Keyboard Tray with Sliding Mouse Tray $47.35; Waterloo Furniture; 803/297-9680, 803/297-9987 (fax). **Reader service no. 733**

Is There a Doctor in the House?

YOU'RE WORKING ON A CRITICAL PROJECT. The clock is racing and your deadline is looming. Then the inevitable happens: You get a Windows error message. No need to panic—provided you have First Aid for Windows Users on your computer. Like a virus checker, First Aid sits unobtrusively in the background until the first sign of trouble. Then it pops up, checks out the problem, and—get this—offers to fix it. I put First Aid to the test by hiding a common DLL that Windows needs in order to operate. Predictably, Windows balked. But First Aid came to the rescue, searching my hard disk, finding the misplaced DLL, and copying it to where it belonged. Pretty amazing. The program also analyzes and repairs configuration problems with more than 20 common Windows applications. First Aid for Windows Users $49.95; CyberMedia; 800/529-2373. **Reader service no. 734**

With CoStar's LabelWriter, you'll never need your typewriter to address envelopes again.

Truth in Labeling

PRODUCING LABELS WITH A LASER PRINTER is a pain—and producing just one label is a pain and a waste of money, since you have to throw away nearly a full sheet. But there's a better way: CoStar's LabelWriter XL Plus is a Rolodex-size printer designed exclusively for labels—all sorts of labels. The bundled Windows software lets you design templates, manage a mailing list, and print a label from an address in almost any Windows application. In fact, if you use Ami Pro, Microsoft Word for Windows, or WordPerfect for Windows, the LabelWriter can automatically produce a label every time you print a document with an address. The LabelWriter is network ready and even prints the new 11-digit postal bar codes. LabelWriter XL Plus $299.95; CoStar; 800/426-7827. **Reader service no. 735**

And the Table Was Just Right

EVEN GOLDILOCKS WOULDN'T COMPLAIN about SOHO's Adjustable Computer Table. A quick twist of two knobs adjusts each shelf to any height between 14 and 48 inches. You can adjust the keyboard up to 20 degrees (which the manufacturer claims will reduce muscle injuries) and set the monitor's height to minimize eye and neck strain. The unit holds your entire system—including a printer—in about 7 square feet, with space left over for supplies. The table includes three 32-by-15-inch work shelves, and you can attach extra shelves for peripherals—up to 100 pounds per shelf. SOHO Adjustable Computer Table $299; SOHO Computer Furniture; 800/299-7646. **Reader service no. 736**

Technicolor Output

GETTING READY TO BUY A NEW LASER printer? Don't do anything until you read this! Monochrome lasers aren't the only game in town. Epson's new Stylus Color Printer cranks out terrific-looking documents at a stunning 720 dpi. Try printing a color photo: In less than 5 minutes you get an astonishingly realistic reproduction (assuming you use specially coated paper). Even on plain paper at 360 dpi, color documents look sharp and clear. With black-and-white documents, the Stylus's print quality rivals that of most laser printers, and its speed is only a bit slower (200 characters per second). Street-priced under $570, the Stylus uses two printheads—one for color, one for monochrome—and has a 100-sheet input tray. Stylus Color Printer $699; Epson America; 800/289-3776.

Out of the Office and Into the Woods

WHAT DO YOU NEED WHEN YOU'RE COMPUTING on the road? Something that's fast, small, and boasts great color. AST's Ascentia 900N 4/50 CS10 fills the bill with a 50-MHz 486DX2 processor, 4MB of RAM, a 340MB hard disk, and a delicious 10.3-inch dual-scan screen running at 640 by 480 with 256 colors. There are plenty of ports—one serial and one parallel plus external video and keyboard ports. The Ascentia also includes an expansion port for PowerStation docking, a 3½-inch floppy drive, and a PCMCIA slot. Want more? Upgrade to a 540MB hard disk, add up to 32MB of RAM, and boost your CPU to a 75-MHz DX4 chip. The Ascentia weighs a reasonable 6.6 pounds and sells for about $2750 on the street. You could certainly find a cheaper laptop, but this fast machine has a great design that will dazzle you and your clients. And if experience serves me well, expect the price to drop by the time you read this. Ascentia 900N 4/50 CS10 $2750; AST Research; 800/876-4278. **Reader service no. 738**

Epson's Stylus Color Printer frees you from drab black-and-white without putting you in the red.

Big Sound From Small Speakers

ONCE YOU GET A TASTE OF MULTIMEDIA, you're hooked. Unfortunately, most people get stuck with those small, tinny speakers that come with their system. Here's some music for your ears: Koss's 5 watts-per-channel HD/100 amplified stereo speakers. Each speaker has a 4-inch driver and a 1½-inch tweeter; volume controls and microphone and headphone jacks are conveniently located on the front. And if you're short on work space (who isn't), Koss's adjustable Speaker Hanger lets you suspend your speakers from the monitor, getting them off your desk and out of the way. HD/100 Computer Speakers $99.99; Koss Computer Speaker Hanger $19.99; Koss Corp.; 800/872-5677, 414/964-5000. **Reader service no. 739**

Paper Pushers, Unite!

YOU'VE FINALLY GOT A FANCY PRINTER, AND I'll bet you could use some business cards or a slick brochure. Instead of calling a graphic designer or heading for the print shop, do it yourself with PaperDirect's cool collection of, well, paper. You'll find an intriguing collection of business cards, letterheads, envelopes, mailers, brochures, and postcards, all with a choice of matching designs and colors. The business cards and postcards are perforated to come apart cleanly, and designing your work is easy because Paper Direct supplies inexpensive software templates. The templates support most major Windows word processors, as well as CorelDraw and Aldus PageMaker. Prices vary by type of product. PaperDirect; 800/272-7377. **Reader service no. 740**

PC WORLD contributing editor Steve Bass is president of the Pasadena IBM Users Group.

For information about all products in this article, circle reader service no. 906.

TOP: ROBERT CARDIN

WHAT CONNECTS *us to* EACH OTHER?

A cosmic bond? An invisible link? Maybe. But for those of us needing more tangible evidence, there's MobiLink.℠ Only local cellular service that has MobiLink guarantees you'll be connected to everyone, just about everywhere in the U.S. and Canada. Including our round-the-clock customer service. In fact, there's just no easier way to make and receive calls with your cellular phone. So make sure your local cellular service has MobiLink. Unless you're feeling unusually confident about your cosmic bonds.

MobiLink

It's simply the way to communicate.℠

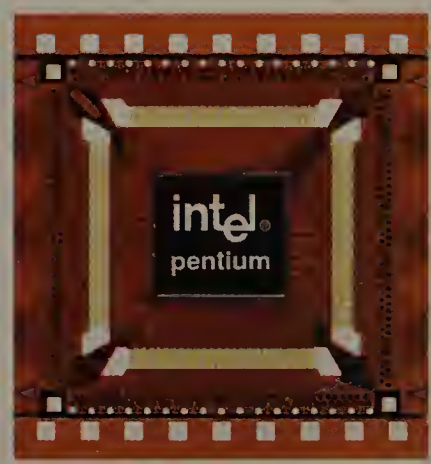
To connect call

1-800-995-4000

Restrictions apply, ask for details. © 1994 MobiLink L.P.

Circle 128 on reader service card

MOBILE PENTIUM.



INTRODUCING THE T4900CT PENTIUM NOTEBOOK.

The 75MHz mobile Pentium™ processor from Intel, with state-of-the-art Tape Carrier Packaging (TCP), is designed specifically for notebooks. Toshiba's engineers have crafted the T4900CT using this processor, so there is no need for fans or special cooling systems. Then they've added advances

T4900CT FEATURES:

- 75MHz Intel Pentium,™ 3.3 volt processor, 16KB cache
- 10.4" dia. color SVGA TFT-LCD active matrix display
- 810 Million Byte (=772MB) HDD
- 8MB RAM expandable to 40MB
- Two PCMCIA slots (10.5mm and 5mm)
- VL local-bus video
- Integrated graphics accelerator
- 65,536 (64K) simultaneous colors
- WAV Audio and MIDI sound
- Audio jacks: headphone/speakers and microphone
- NiMH battery for extended life
- 6.9 lbs.
- 3.5" 1.44MB floppy disk drive
- Accupoint™ integrated pointing device
- Pre-installed software: DOS, Windows for Workgroups,® Windows Sound System,™ Run Time Video for Windows,™ Fn-esse™ software and Indeo™ video
- Toll-free Technical Support— 7 days a week, 24 hours a day

intel inside pentium PROCESSOR

3 YEAR LIMITED WARRANTY

energy EPA POLLUTION PREVENTER

PORTABLE MAXIMUM.

Dock into the optional Desk Station IV for instant connection to your monitor, full-size keyboard, printer, and network. The T4900CT with Desk Station IV is all the computer you need.

The 10.4" color active matrix screen displays 65,536 (64K) simultaneous colors for stunningly realistic images and brilliant graphics.

10.4" dia.

Take all your files with you, including full-motion video and multimedia with the 810 million bytes (=772MB) hard disk drive.

810 MILLION BYTES

indeo™ INTEL VIDEO TECHNOLOGY

Indeo video bolstered by the 75MHz mobile Pentium provides smooth playback of full-motion and full-screen video.

The built-in sound system includes a microphone and speaker, plus ports for an external microphone and speakers or headphones.

Dual PCMCIA expansion slots (Type II and Type III) run simultaneously—for connection to your LAN, fax/modem and more.

like an AccuPoint™ integrated pointing device, 10.4" color active matrix display, and plug-and-play connection to peripherals. You can even blast MIDI and .WAV Audio through the built-in speaker or audio jacks for more dynamic multimedia presentations. See and hear this Pentium-powered touring machine today. **Call 1-800-457-7777 for the dealer nearest you.**

In Touch with Tomorrow

TOSHIBA

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Circle 226 on reader service card

Buyers' Guide to Printers:

The 2-Step Program

A simple strategy for finding the printer that's right for you. BY DAN MILLER

Step 1: Find out what kind of printer you need...

Color or Black-and-White?

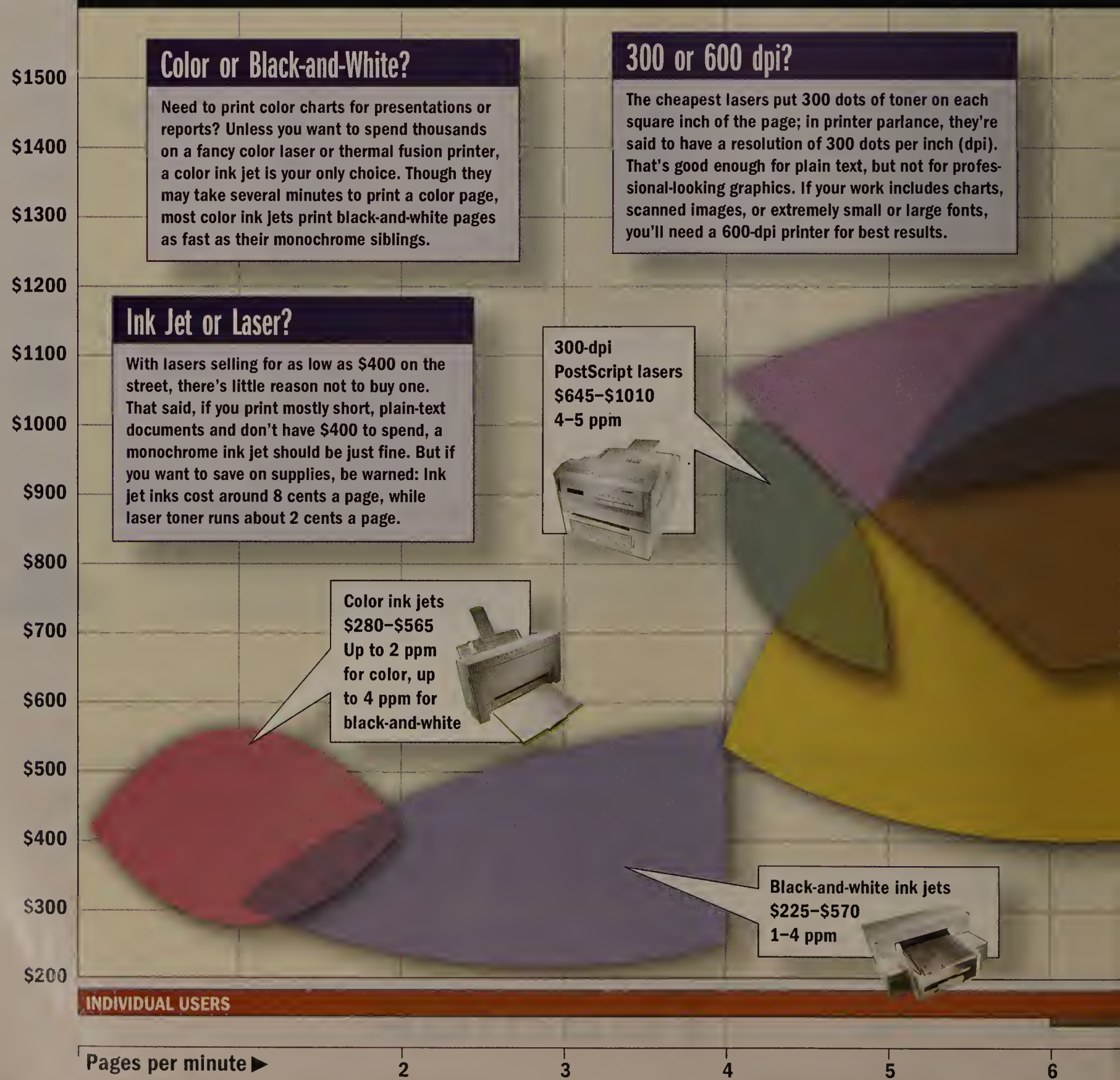
Need to print color charts for presentations or reports? Unless you want to spend thousands on a fancy color laser or thermal fusion printer, a color ink jet is your only choice. Though they may take several minutes to print a color page, most color ink jets print black-and-white pages as fast as their monochrome siblings.

300 or 600 dpi?

The cheapest lasers put 300 dots of toner on each square inch of the page; in printer parlance, they're said to have a resolution of 300 dots per inch (dpi). That's good enough for plain text, but not for professional-looking graphics. If your work includes charts, scanned images, or extremely small or large fonts, you'll need a 600-dpi printer for best results.

Ink Jet or Laser?

With lasers selling for as low as $400 on the street, there's little reason not to buy one. That said, if you print mostly short, plain-text documents and don't have $400 to spend, a monochrome ink jet should be just fine. But if you want to save on supplies, be warned: Ink jet inks cost around 8 cents a page, while laser toner runs about 2 cents a page.



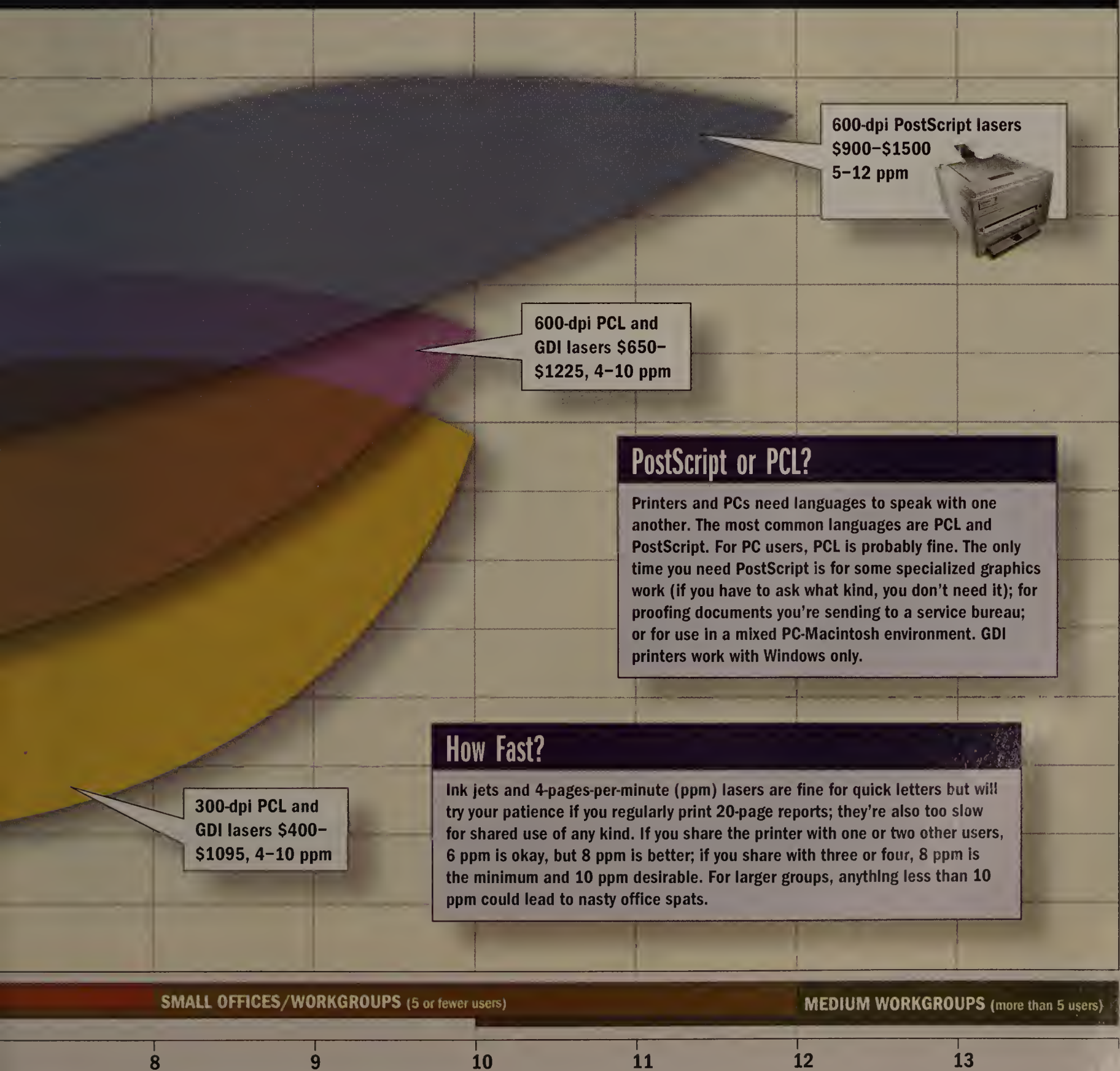
YOU'D THINK BUYING A PRINTER WOULD be easy. You figure out what kind you need, then find the model that best meets those needs. Think again, Sherlock. Finding the right printer can take a lot of detective work. Hence this guide to printers for the home and small office.

The chart below shows price ranges for a variety of personal printers, from inexpensive black-and-white ink jets to fast high-resolution lasers. Your first step is to read the buying tips in the chart below and answer a few questions: Do you need an ink jet or a laser? Color or black-and-white? 300 or 600 dpi? Use the chart below to find out how much your printer is likely to cost.

Then you're ready for step 2. Turn to the tables on the following pages, where we've collected all the necessary details on ink jets and lasers from the leading printer vendors. Now find the printers that have the features you need. Between the charts and our advice, you should have no trouble finding the right printer at the right price.

Dan Miller is an associate editor for PC World.

...and find out how much it will cost.



PostScript or PCL?

Printers and PCs need languages to speak with one another. The most common languages are PCL and PostScript. For PC users, PCL is probably fine. The only time you need PostScript is for some specialized graphics work (if you have to ask what kind, you don't need it); for proofing documents you're sending to a service bureau; or for use in a mixed PC-Macintosh environment. GDI printers work with Windows only.

How Fast?

Ink jets and 4-pages-per-minute (ppm) lasers are fine for quick letters but will try your patience if you regularly print 20-page reports; they're also too slow for shared use of any kind. If you share the printer with one or two other users, 6 ppm is okay, but 8 ppm is better; if you share with three or four, 8 ppm is the minimum and 10 ppm desirable. For larger groups, anything less than 10 ppm could lead to nasty office spats.

JEFF BERLIN

Step 2: Find out which printers are right for you.

COMPANY	PRODUCT	ESTIMATED STREET PRICE	RESOLUTION (dpi)	SPEED [1] (ppm)	STANDARD EMULATIONS	READER SERVICE NUMBER
300-dpi Laser Printers						
BROTHER INT'L 800/276-7746	HL-630	$399	300 x 300	6	PCL 4	815
C-TECH 800/347-4017	C.Itoh ProWriter CI-44 Little Laser	$430	300 x 300	4	GDI	816
NEC TECHNOLOGIES 800/632-4636	SilentWriter SuperScript 610	$450	300 x 300	6	GDI	817
OKIDATA 800/654-328	OL400e	$475	300 x 300	4	PCL 4	818
SHARP ELECTRONICS 800/237-4277	JX-9400H	$479	300 x 300	8	PCL 4	819
TEXAS INSTRUMENTS 800/848-3927	microWriter	$485	300 x 300	5	PCL 4	820
PANASONIC 800/742-8086	KX-P4400 SideWriter	$513	300 x 300	4	PCL 4	821
EPSON AMERICA 800/289-3776	ActionLaser 1100	$530	300 x 300	4	PCL 5	
CANON COMPUTER SYSTEMS 800/848-4123	LBP-430	$555	300 x 300	4	PCL 5	823
OKIDATA 800/654-3282	OL410e	$618	300 x 300	4	PCL 5	818
EPSON AMERICA 800/289-3776	ActionLaser 1500	$635	300 x 300	6	PCL 5	
DIGITAL EQUIPMENT CORP. 800/777-4343	DECIaser 1800	$639	300 x 300	6	PCL 5	824
TEXAS INSTRUMENTS 800/848-3927	microWriter PS23	$645	300 x 300	5	PostScript, PCL 4	820
DIGITAL EQUIPMENT CORP. 800/777-4343	DECIaser 1152	$659	300 x 300	4	PostScript, PCL 4	824
FUJITSU 800/626-4686	PrintPartner 4000	$675	300 x 300	4	PCL 5	825
HEWLETT-PACKARD 800/752-0900	HP LaserJet 4L	$687	300 x 300	4	PCL 5	826
CITIZEN AMERICA 800/477-4683	ProLaser 6000	$700	300 x 300	6	PCL 5	827
MANNESMANN TALLY 800/843-1347	MobileWriter	$837	300 x 300	6	PCL 4	828
PANASONIC 800/742-8086	KX-P5400 SideWriter	$840	300 x 300	4	PostScript, PCL 4	821
OKIDATA 800/654-3282	OL410e/PS	$925	300 x 300	4	PostScript, PCL 5	818
FUJITSU 800/626-4686	PrintPartner 8000	$975	300 x 300	8	PCL 5	825
PANASONIC 800/742-8086	KX-P4440	$975	300 x 300	10	PCL 5	821
HEWLETT-PACKARD 800/752-0900	HP LaserJet 4ML	$1010	300 x 300	4	PostScript, PCL 5	826
LASERMASTER 800/365-4646	WinPrinter 1000	$1095	400 x 400	4	PCL 4, GDI	829
600-dpi Laser Printers						
NEC TECHNOLOGIES 800/632-4636	Silentwriter SuperScript 660 Silentwriter SuperScript 660i	$649 $799	600 x 600 600 x 600	6 6	GDI GDI	817 817
TEXAS INSTRUMENTS 800/848-3927	microLaser 600	$899	600 x 600	5	PostScript, PCL 5	820
SHARP ELECTRONICS 800/237-4277	JX-9460PS	$904	600 x 600	6	PostScript, PCL 5	819
EPSON AMERICA 800/289-3776	ActionLaser1600	$935	600 x 600	6	PCL 5	

[1] All speeds are vendor estimates. Ink jet speeds in letter quality mode unless otherwise noted.

Encourage exhibitionism.
Get the new HP DeskJet 1200C printer. $1,699.

Clear, vivid, 300-dpi color with ColorSmart.

LaserJet compatibility and networkability.

600 x 300-dpi text with Resolution Enhancement technology.

$1,699 list price, actual price may be lower.

The speed, stamina and reliability you expect from HP.

*For more information and print samples call 1-800-821-8440, Ext. 8581.**

HP Printers

HEWLETT® PACKARD

*In Canada call 1-800-387-3867. ©1994 Hewlett-Packard Company PE12411

COMPANY	PRODUCT	ESTIMATED STREET PRICE	RESOLUTION (dpi)	SPEED [1] (ppm)	STANDARD EMULATIONS	READER SERVICE NUMBER
LEXMARK INT'L 800/358-5835	ValueWriter 600	$959	600 x 600	5	PCL 4	830
HEWLETT-PACKARD 800/752-0900	HP LaserJet 4P	$975	600 x 600	4	PCL 5	826
MANNESMANN TALLY 800/843-1347	T 9008	$1000	600 x 600	8	PCL 5	828
XEROX 800/275-9376	Xerox 4505 Desktop Laser Printer	$1050	600 x 600	5	PCL 5	831
LEXMARK INT'L 800/358-5835	WinWriter 600	$1215	600 x 600	10	PCL 4, GDI	830
C-TECH 800/347-4017	C.Itoh ProWriter CI-88 Laser Printer	$1225	600 x 600	8	PCL 5	816
GCC TECHNOLOGIES 800/422-7777	Elite 600et	$1479	600 x 600	10	PostScript, PCL 5	832
GENICOM 800/436-4266	Genicom 7612	$1499	600 x 600	12	PostScript, PCL 5	833
Color Ink Jet Printers						
LEXMARK INT'L 800/358-5835	ExecJet IIc	$279	300 x 300	.4 ppm [2]	PCL 3, IBM Proprinter	830
HEWLETT-PACKARD 800/752-0900	DeskJet 320	$329	600 x 300	.25 ppm [2]	PCL 3	826
TEXAS INSTRUMENTS 800/848-3927	microMarc Color	$359	300 x 300	1 ppm [2]	PCL 3	820
DIGITAL EQUIPMENT CORP. 800/777-4343	DECcolorwriter 520ic	$379	600 x 300	.33 ppm [2]	PCL 3, Epson LQ	824
STAR MICRONICS 800/506-7827	SJ-144 [3]	$432	360 x 360	80 cps [2]	IBM Proprinter, Epson LQ	834
CANON COMPUTER SYSTEMS 800/848-4123	Bubble-Jet BJC-600	$451	360 x 360	170 cps [2]	IBM Proprinter, Epson LQ	823
	Bubble-Jet BJC-4000	$529	720 x 360	.8 ppm	IBM Proprinter, Epson LQ	823
HEWLETT-PACKARD 800/752-0900	DeskJet 560C	$563	300 x 300	.25 ppm [2]	PCL 3	826
EPSON AMERICA 800/289-3776	Stylus Color	$565	720 x 720	.2 ppm [2]	Epson ESC/P2	
Black-and-White Ink Jet Printers						
CANON COMPUTER SYSTEMS 800/848-4123	Bubble-Jet BJ-100	$225	360 x 360	124 cps	IBM Proprinter, Epson LQ	823
	Bubble-Jet BJ-10sx	$229	360 x 360	110 cps	IBM Proprinter, Epson LQ	823
EPSON AMERICA 800/289-3776	Stylus 400	$265	360 x 360	120 cps	Epson ESC/P2	
	Stylus 800 Plus	$265	360 x 360	165 cps	Epson ESC/P2	
CANON COMPUTER SYSTEMS 800/848-4123	Bubble-Jet BJ-200e	$269	360 x 360	173 cps	IBM Proprinter, Epson LQ	823
CITIZEN AMERICA CORP. 800/477-4683	Projet II	$280	300 x 300	210 cps	PCL 3	827
LEXMARK INT'L 800/358-5835	ExecJet II	$287	600 x 300	2 ppm	PCL 3, IBM Proprinter	830
C-TECH 800/347-4017	C.Itoh ProWriter SpeedJet CJ-300	$315	300 x 300	300 cps	PCL 3	816
BROTHER INT'L 800/276-7446	HJ-400	$319	360 x 360	110 cps	IBM Proprinter, Epson LQ	815
MANNESMANN TALLY 800/843-1347	MobileJet	$333	300 x 300	100 cps	PCL 3	828
HEWLETT-PACKARD 800/752-0900	DeskJet 540	$365	600 x 300	3 ppm [4]	PCL 3	826
CANON COMPUTER SYSTEMS 800/848-4123	Bubble-Jet BJ-230	$375	360 x 360	173 cps	IBM Proprinter, Epson LQ	823
DIGITAL EQUIPMENT CORP. 800/777-4343	DECwriter 500i	$399	600 x 300	160 cps	PCL 3, Epson LQ	824
EPSON AMERICA 800/289-3776	Stylus 1000	$439	360 x 360	150 cps	Epson ESC/P2	
CALCOMP 800/932-1212	TechJet Personal	$570	360 x 360	124 cps	PostScript	835

[2] In color mode; monochrome print speed is comparable to that of a monochrome-only ink jet. [3] Actually a thermal fusion printer, but functionally comparable to an ink jet. [4] Draft mode.

For more information about all products in this table, circle reader service no. 907.

Who would have believed you could buy a Laser Printer for only $399?

We Did.

Introducing the Brother HL-600 Series Laser Printers, with exclusive Straight Paper Path Technology that sets a new standard in quality and value.

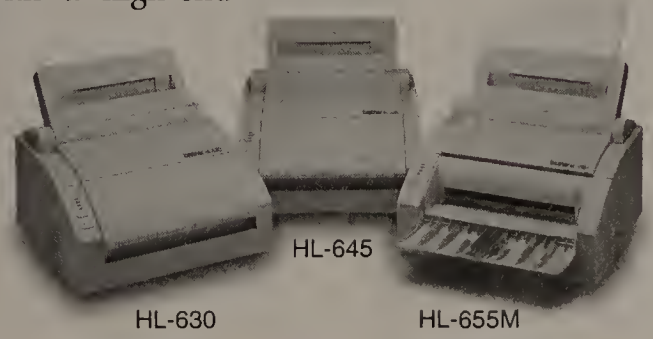
If your next laser printer doesn't have our exclusive Straight Paper Path Technology, that may put a wrinkle in many of your printing projects.

That's because our laser printers don't take your paper down a curvy, twisty paper path like other laser printers. So everything comes out straighter and faster (up to a blazing 6 pages per minute). You'll be able to automatically stack and feed those troublesome envelopes (up to 10 at a time), and paper sizes as small as 2.75" X 5" without having to worry about how they'll look when they come out. You can print not only standard paper stocks, but also tri-fold brochures, invitations, newsletters, etc. It's like having your own personal print shop!

Versatility is just the beginning because our Straight Paper Path Technology virtually eliminates those horrifying paper jam glitches that usually force you to disassemble your laser printer.

Technologically remarkable... yet remarkably affordable.

Our HL-600 Series Laser Printers, the first in a new family of quality printers, also offers other advanced features like fast Windows™ printing, Enhanced Memory Management to help you fly through large complex files, numerous fonts, auto power save mode to save energy costs, microfine toner, optional Macintosh® compatibility, and more. Yet, unlike other laser printers with similar high-end features, our new laser printers don't come with a high-end price tag. They start at $399. (Yes, laser for $399!)



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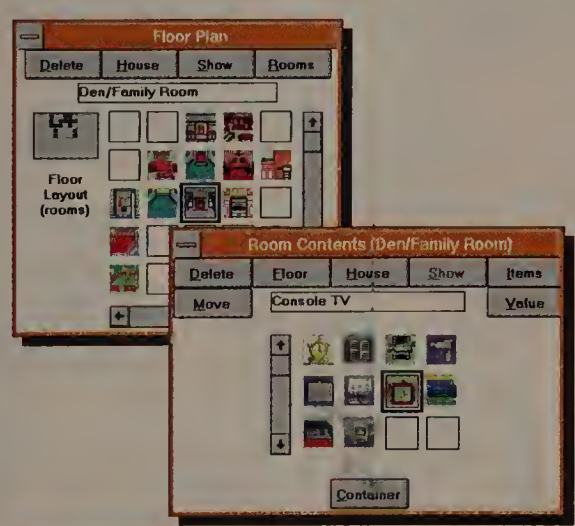

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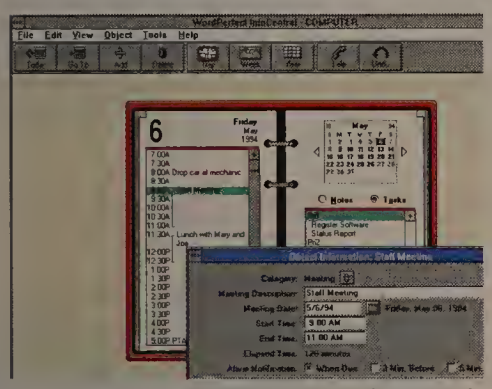

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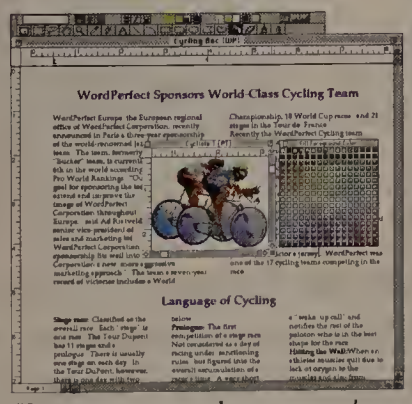

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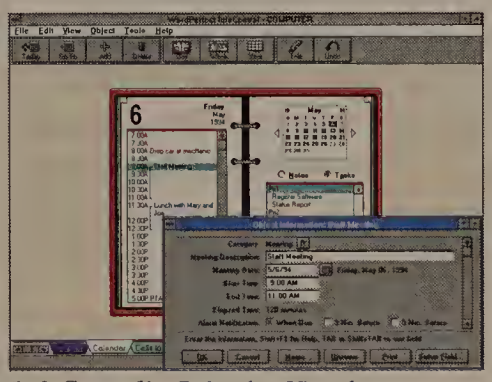

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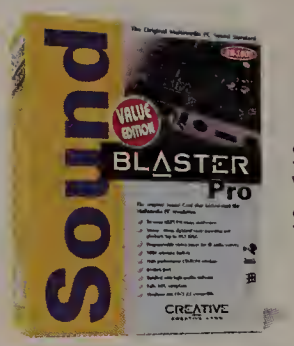

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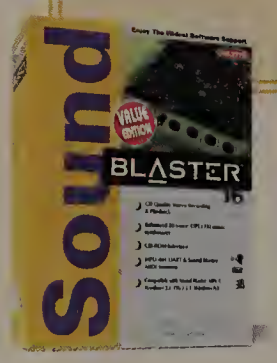

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Circle 7 on reader service card

Here's How

Contents: Spreadsheets 302 | Word Processing 306 | Windows 312

HELP LINE Q & A

Tip of the Month

STEPPING UP TO MS-DOS 6.22: Users of MS-DOS 6.0, 6.2, and 6.21 can upgrade to 6.22 with the MS-DOS 6.22 Step-Up package, available free from Microsoft via the company's download service (206/936-6735) and its CompuServe forum (GO MICROSOFT) or on disk from its customer service department (800/777-3320).

Step-Up (unlike the full MS-DOS 6.22 Upgrade) includes only those changes made to MS-DOS since the introduction of 6.0, such as the replacement of DoubleSpace compression with DriveSpace compression, and the addition of ScanDisk.

For this upgrade to work, your DOS version must not have been modified by a hardware vendor. If it has, you'll need to use an upgrade from that vendor or get the full upgrade from Microsoft. Also, if you've deleted any DOS files from your earlier version, Step-Up's upgrade may abort or not update that file. In such a case, the simplest solution is to reinstall your earlier version, then upgrade to 6.22.

DoubleSpace users who upgrade to DOS 6.22 can continue to use DoubleSpace. Those who want to convert DoubleSpace drives to DriveSpace format should obtain the Microsoft DoubleSpace Conversion Kit from the sources mentioned above.

Shane Rau, Assistant Technical Editor

Rub-a-Dub-Dub, Keys in the Tub

Q There's no part of my computer dirtier than the keyboard, and although I keep my office fairly clean, the keyboard still gets pretty grungy. I've heard this rumor that you can simply unplug your keyboard, take it into the shower, and wash it off. It seems like this would damage the keyboard's electronics. Is it okay to immerse a keyboard?

Sung Chee Chan, Taipei, Taiwan

A The answer is a qualified yes—you can probably hose your keyboard down and live to type about it later—but I wouldn't recommend taking a chance on it until you've exhausted all the other cleaning alternatives. I spoke to support personnel at several keyboard manufacturers, and while none had a solid reason why immersing a keyboard was bad, all advised against it.

Like anything that sits around your desk long enough, a keyboard is subjected to a rain of dust, hair, bits of paper, and other desktop detritus. All of this junk gets under the keys and can prevent them from contacting properly when depressed (or have the opposite effect, making keys stick and repeat). If you encounter such behavior, take your keyboard outside, turn it upside down, and give it a good shake. For good measure, blow the dust out of the inverted keyboard using pressurized air. If that doesn't work, pry off the offending key cap, and give the socket a blast or air.

If your keyboard looks like a mechanic has been typing on it (or perhaps you *are* a mechanic), unplug it, spray a little glass cleaner or warm water on a cloth, and scrub away. This should return it to near-showroom sparkle. If any liquid at all drips down into the keys, let the keyboard dry before plugging it back in and turning on the computer. To avoid this problem altogether, make sure the cloth is damp, not sopping.

It's more of a stupid PC trick than a practical solution, but full immersion might actually make sense in a few situations. Should you spill soda or coffee into your keyboard, for example, your best remedy is to unplug the unit and run it under the tap right away before the liquid dries. To avoid subsequently short-circuiting your computer, it's very important to make sure the keyboard is completely dry before plugging it back in. Swing it a few times like a baseball bat to force out most of the water, then prop it up in several different orientations to drain all the interior crannies; depending on your local climate, your keyboard could take several days to dry out. I gave my own keyboard a warm bath with excellent results, but "your mileage may vary."

Whip Word Outlines Into Shape

Q I spend a lot of time using Word 6.0 for Windows' Outline View. It's a lifesaver of a feature, but I also spend a lot of time getting the outline displayed properly after I open each document. I like to view my outlined (but not my nonoutlined) documents using Word's more legible draft font with the outline mostly collapsed and just the first few heading levels showing. I also keep track of whether my research or editing of a particular outline section is complete by formatting the heading text in a color—green as "finished," for example. Unfortunately, no matter how perfectly I arrange outlines before closing them, when I open them again, they are

RANDY LYHUS

fully expanded, and the draft font and color text formatting, for no apparent reason, may or may not be enabled. Is there some way to make these settings "stick," or am I stuck?
Joe Schmidt, Tatamagouche, Nova Scotia, Canada

A There's no way to save Outline View settings along with the file, but you can do almost everything you listed using a WordBasic macro. I've written a sample AutoOpen macro (see **FIGURE 1**) that addresses most of your requirements and executes automatically every time you open a file. It starts by checking your document for Word's default top-level outline heading (Heading 1), then switches to Outline View, changes to the draft display font, and collapses the outline down to just the first three heading levels. If the macro doesn't find a paragraph formatted in the Heading 1 style, it assumes the document is not an outline and displays it in Normal view. (If you use the Heading 1 style in your nonoutlined documents, change the macro to look for Heading 2, or create a different name for the heading style in your nonoutlined files.)

To create the macro, select *Tools•Macro*, type **AutoOpen** in the Macro Name field, and click the *Create* button. Next, enter the contents of Figure 1 in the resulting window (Word provides the beginning and ending Sub MAIN and End Sub statements for you). Then, select *File•Save Template*, and close the file. Now whenever you open a file in Word, the macro will automatically do your outline housekeeping.

```
Sub MAIN
StartOfDocument
On Error Goto Finish
EditFindStyle .Style = "Heading 1"
EditFind .Find = " ", .Format = 1
A = EditFindFound()
If A = 0 Then Goto Finish
ViewOutline
ViewDraft 1
ShowHeading3
Finish:
StartOfDocument
End Sub
```

FIGURE 1: DISPLAY OUTLINES AS YOU LIKE THEM using an AutoOpen macro like this one.

The one thing a macro can't do is enable the Show Format button, which lets you see color text in Outline View. Unlike many other WordBasic statements, OutlineShowFormat only toggles the Show Format button and can't be used as a function to let you first determine whether the button is already depressed. Putting the statement into your macro would be just as likely to turn the feature off as on—even more likely if you spend most of your time with Show Format enabled. When you switch to Outline View, Word sets the button to the same state it was in the last time you used the mode, regardless which document is open. As a result, you're better off simply turning the feature on manually; if you always exit Outline View (by means of switching to another kind of view) with Show Format enabled, it should be on the next time you open an outline.

Terminator Blues

Q I use an internal CD-ROM drive connected to a SCSI adapter. Both the card and the CD-ROM are terminated since they're usually the only devices on the SCSI bus, and therefore each resides at one end of the chain. Occasionally I attach an external optical drive and thus change the bus topology, leaving the SCSI board in the middle. This means I have to remove the termination from the board itself, a hassle that requires opening the box when I want to use the optical drive.

Can I remove the termination from the card and plug a terminator into the external plug of the card when I'm not using the drive, then move the terminator to the drive when using it? In

USER GROUP OF THE MONTH

Long Beach IBM Users Group

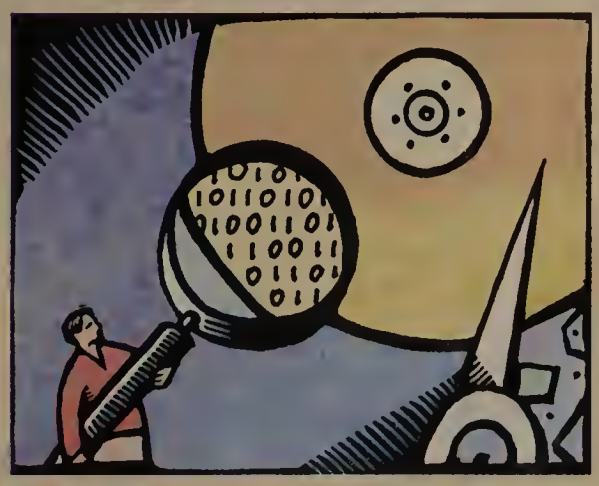
December's user group tips are supplied by the Long Beach IBM Users Group. In addition to operating an electronic bulletin board, the Long Beach, California, group publishes a 12-page monthly newsletter that includes special interest group reports and agendas, hardware and software reviews, a listing of currently available shareware, and the Members Helping Members resource directory. The group meets on the third Wednesday of the month at 7 p.m. at the International City Masonic Lodge, 5155 E. Pacific Coast Highway (at Clark Avenue), in Long Beach. There are more than ten special interest groups; topics include DOS, Windows, WordPerfect, dBASE, desktop publishing, hardware repair, and OS/2.

For more information about the Long Beach IBM Users Group, contact David Weil, president, 4176 Woodruff Ave. #517, Lakewood, CA 90713, or call 310/420-3670. The group's BBS number is 310/420-1000. General meetings are free. Individual membership costs $25 a year; the family rate is $35. Membership includes the newsletter, admission to the special interest groups, download privileges on the BBS, and a five-disk introduction pack.

Reader service no. 606

LOOK BUT DON'T TOUCH: Display your system's hard drive partition information without starting FDISK by entering FDISK /STATUS at the DOS prompt. You'll get the information you want and not risk accidentally altering the partitions.

Kevin Criswell
Long Beach IBM Users Group



other words, can a SCSI board be terminated by means of a terminator on the outside instead of via the jumpers on the board itself?
Jim Schwartz, San Francisco

A Yes, SCSI termination is SCSI termination, whether it takes place on the surface of the board or in an external terminator plug. If your SCSI adapter has a 25-pin connector instead of the usual 50-pin Centronics connector (the case with many no-name adapters bundled with scanners and magneto-optical drives), you won't be able to connect a terminator to it directly. You can still try connecting a 25-pin-to-Centronics cable, then installing the terminator on the Centronics end of the cable. According to one SCSI adapter manufacturer, whose subsidiary still manufactures 25-pin SCSI adapters, this should work. However, if you have many other devices connected to the SCSI bus, voltage on the bus's termination line could be too low, resulting in faulty termination. Also, the company warns that this dangling cable may act as an antenna, picking up interference from radio and electromagnetic sources. To minimize interference, use the shortest possible cable, and keep it away from monitors and other RF and EMF generators.

Give Me Back My Memory

Q I have problems running programs, especially high-quality games like Return to Zork and X-Wing, because of insufficient memory. I have 8MB of RAM and manage memory using DOS 5.0's HIMEM.SYS and EMM386.EXE. The system also contains a CD-ROM drive, and from time to time, to preserve enough memory to run a particular application, I need to delete the CD-ROM drivers from CONFIG.SYS and AUTOEXEC.BAT. Will DOS 6.2's improved memory manager give me enough memory to use my CD-ROM drive and also run these applications?
Ryan Retting, Tarzana, California

A DOS 6.2's memory management is a little better than DOS 5.0's, and it also includes an optimizer, MEMMAKER, that does a fairly good job of automatically moving drivers and TSRs out of conventional memory and into free upper memory blocks (UMBs)—the 640K-to-1024K region. But if you also load network, SCSI, audio, or other drivers, these improvements may not free enough RAM to run a DOS-based CD-ROM adventure like Return to Zork. For about $40, you can get Helix Software's Multimedia Cloaking; it replaces your mouse driver, disk cache, and MSCDEX.EXE with its own, which all run in extended memory, freeing UMBs for other drivers. (Helix Software's $99 memory manager, NetRoom, can free even more memory by replacing much of your video and system BIOSes with versions that run in extended memory. It comes bundled with Multimedia Cloaking for $89.90.)

However, you may be able to free considerably more RAM with DOS's memory manager alone by manually optimizing the order in which drivers and TSRs are loaded. EMM386.EXE tries to load drivers and TSRs into the patchwork of available UMBs on a first-come, first-served basis, using the largest UMBs first. If a program won't fit into the largest available UMB, DOS loads it into conventional memory. One more thing: Some programs need more memory while loading than they occupy when installed. The secret to manual optimization is to load first the programs that use the most memory while loading and the least once resident.

Instructions for this can be found in the MS-DOS user guide (page 148 for versions 6.0 and 6.2, page 128 for versions 6.21 and 6.22). The technique takes advantage of a data file created by the MEMMAKER optimizer that lists the size of each program loaded in CONFIG.SYS during and after loading.

Since DOS 5.0 doesn't include MEMMAKER, optimization is largely by trial and error. First, make a backup copy of your boot files. Using a text editor, make sure that each driver (except HIMEM.SYS and EMM386.EXE) in CONFIG.SYS begins with **DEVICEHIGH=**, and each TSR in AUTOEXEC.BAT with **LH** and a space. (Note: some drivers, such as Adaptec's ASPI SCSI driver, may not work in upper memory.)

Next, enter the command **MEM /C/P** at the DOS prompt to view the sizes of drivers in memory. Try rearranging the order of drivers in CONFIG.SYS and AUTOEXEC.BAT so that the largest load first, and then reboot. Check MEM again. If there's only a small improvement, move a program to the top or bottom of the boot file more or less at random, or simply try loading it low (this stratagem may allow other programs to make better use of the UMB). With persistence, you should be able to free 590K to 600K, which is enough for almost any DOS application.

- **Helix Software**, 800/451-0551
  Reader service no. 607

Partition Viruses Off?

Q I have been advised to partition my hard drive into a very small C: drive, on which I should keep only DOS files, and a D: drive, on which I should keep everything else. The idea is that boot sector viruses could then scramble only my C: drive, which could be easily reconstructed. Is there any truth to this?
Anthony L. Perez, MCI Mail

A The advice you received is true for some virus types, but not all. Many viruses, such as Stoned, restrict themselves to infecting boot sectors; infection can come only from booting with an infected floppy, which then infects the hard disk's boot sector or partition table. If it is a destructive virus, its naughtiness would likely be limited to C:, so keeping C: small could have some benefit. Unfortunately, many viruses are capable of infecting boot sectors, partition tables, *and* files. If your PC contracted one of these, the files on your D: drive would become infected, and they might reinfect drive C:'s boot sector or partition table after reformatting. Instead of hoping for an easier recovery from virus attack by keeping drive C: small, you would be better off simply employing an antivirus program.

By Scott Spanbauer

Scott Spanbauer is a contributing editor for PC World. *Help Line Q&A welcomes your questions (see page 12 for contact information).*

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SPREADSHEETS Q & A

Calculate Running Totals in Any Spreadsheet

Q I keep track of our company's invoices in a worksheet. As they arrive, I enter the details in columns A through L [see **FIGURE 1**]. The formulas in column M display each row's total. If there's no data on that line, the total shows zero. The formulas in column N keep a running total of the invoices. For example, cell N3 contains +N2+M3, which adds the current invoice amount to the previous running total.

Here's my problem: After the last invoice, the running total formula just duplicates the previous total. What's the correct way to set this up?
Jim Price, Edmonton, Alberta, Canada

A In place of your formula, enter this one into cell N2: **@IF(M2=0,"– ",@SUM(M2..M2))**. Then copy the formula down the column. (In Excel, begin the formula with an equal sign and remove the @ signs.) This formula uses a SUM function to calculate the running total. Notice that the first part of its range address, M2, is absolute, so it won't shift when you copy it. The second part, M2, is relative. When you copy this formula, the range of the SUM function "stretches" to include all the invoice totals up to the current row (shown in cell N6 in Figure 1).

As a further refinement, the IF function displays a dash followed by a space if the invoice total in column M is zero. This feature helps you keep better track of the running total's accuracy.

A:N6 @IF(M6=0,"- ",@SUM(M2..M6))

	J	K	L	M	N	O
1	Detail	Detail	Detail	Totals	Running Total	
2	316	215	857	1388	1388	
3	613	910	323	1846	3234	
4				0	-	
5				0	-	
6				0	-	

FIGURE 1: SET UP ACCUMULATING RUNNING TOTALS using a SUM formula with an expandable range.

Defining Column Data Types in Any Spreadsheet

Q I use 1-2-3 release 4.0 to keep lists of purchase order data. One column contains dates; another holds account numbers that usually consist of digits but may contain letters, too. I want to enter the account numbers as labels so they'll sort correctly. How can I set up my worksheet so I don't have to type an apostrophe before each one?
Wanda Ellison, San Francisco

A Most of today's spreadsheet programs (except 1-2-3 release 2.*x*) let you define in advance the type of data you can enter in a column, making data entry much easier.

1-2-3 release 3.*x*: To format a column for labels, you execute the command */Range•Format•Other•Label* and select the range within the column. For dates, use */Range•Format•Other•Automatic*, then enter your dates in one of the formats 1-2-3 allows—like 1/1/95.

1-2-3 release 4.0 for Windows: For labels, select the range or entire column and choose *Style•Number Format•Label*. Automatic formatting is the default, so dates are taken care of.

Microsoft Excel: Select the range or entire column, then choose *Format•Cells* and double-click *Text* in the Category list. Excel interprets dates properly as long as you enter them in a standard format, such as 1/1/95.

Quattro Pro for DOS: Select */Database•Data Entry*, choose *Labels Only* or *Dates Only*, and select the range. Quattro Pro not only formats your entry, it also prevents you from entering items that aren't dates in the date columns.

Quattro Pro for Windows: Select the column header and choose *Block Properties*. In the resulting dialog box, click *Data Entry Input*, then choose either *Labels Only* or *Dates Only*.

Dynamic Macro Prompts in 1-2-3

Q I'm creating a macro in 1-2-3 release 4.0 for Windows, and I want to set up a dialog box prompting the user to enter some numerical information. 1-2-3 provides a command for this purpose; its basic syntax is {GetNumber "*prompt*"; *location*}, where *prompt* is a message displayed in the dialog box and *location* is the cell where the user enters a response. Instead of having actual text in the prompt section of the command, I want to reference a worksheet cell and display its text as the prompt. Is it possible to do this?
Jerry Debner, Roseville, Minnesota

A Recent releases of 1-2-3 have introduced a simpler syntax for doing this. Let's say that a prompt such as 'Enter the interest rate' is in a cell named \A_PROMPT. After the user responds, you want the macro to put the results in a cell called \A_RESULT. To arrange this, you just use the macro statement **{GETNUMBER +\A_PROMPT;\A_RESULT}**. The plus sign in this statement causes 1-2-3 to interpret what follows as a formula; that's why you can use the range name \A_PROMPT instead of the prompt text itself.

Exporting Delimited Text From 1-2-3

Q I know how to bring a delimited text file (downloaded from our company's minicomputer) into 1-2-3 using */File•Import•Numbers*. But how can I get worksheet data into delimited format so I can upload it?
Mel Higby, Warrenton, Vermont

A In any version of 1-2-3 you can first use formulas to construct a series of delimited strings, then put the strings in a text file. Let's say your worksheet has labels in columns A and C and numbers in column B, beginning in row 1. In cell D1, enter the formula **+"""&A1&""", "&@STRING(B1,0)&","""&C1&"""", and make** a copy for every row of data. The result is a delimited string, with commas between the values and quotes around

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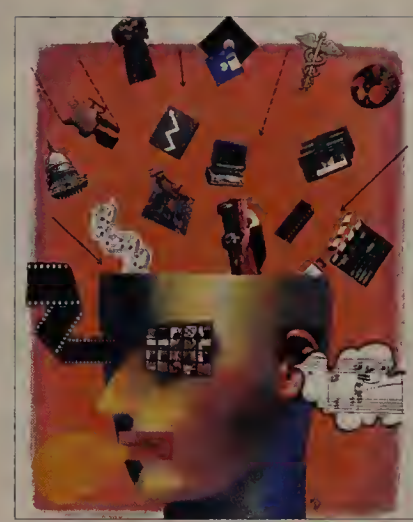

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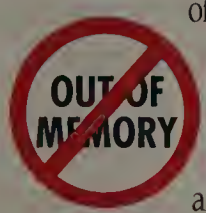

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Master Class: Excel's Dynamic Range Names

The holy grail of building efficient worksheets is to create models that require a minimum of fuss and maintenance—that is, set it and forget it. Range names are one of the most important tools in this effort. Formulas, graphs, and other structures based on range names, not directly on cell addresses, can adjust gracefully when you add or remove worksheet data. This month I'll illustrate Microsoft Excel's unique ability to create *dynamic* range names, which automatically accommodate data ranges that vary in size.

Dynamic range names rely on the fact that in Excel names can refer to a formula instead of a range. For example, let's say you have a constant value, like next year's anticipated inflation rate (3.5 percent), that you want to use in many different formulas. In release 5.0 you'd normally enter the value into a cell and use the command Insert • Name • Define to create a name such as Rate that refers to that cell. Thereafter, you could use the name in formulas, instead of the cell address—as in, for instance, =Rate+1.

Now try this alternative: In an empty sheet, select *Insert • Name • Define* and type Rate in the Names in Workbook box. Then, in the Refers To box, enter the very simple formula =.035. Now you can pick a cell and enter a formula like =Rate+1, and you'll get the value 1.035. The name provides the value, but no cell is involved.

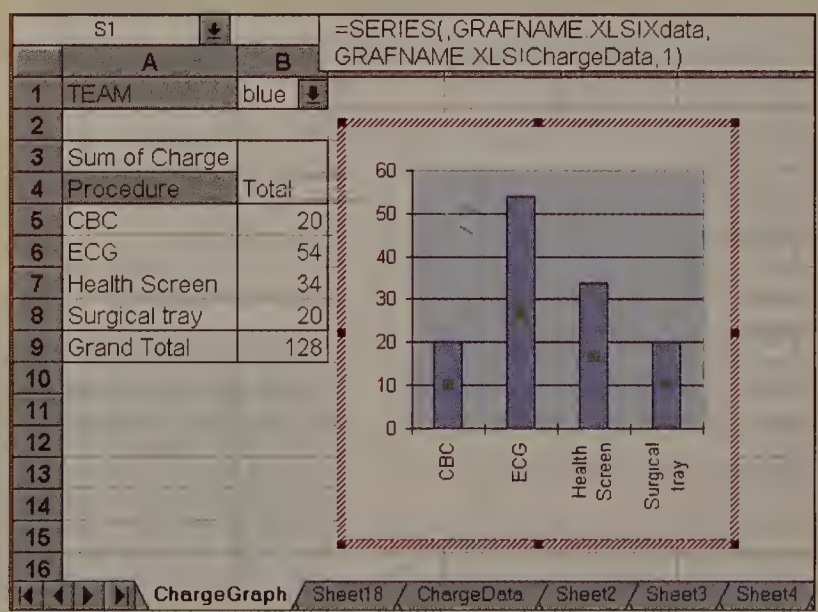

FIGURE 1: EXCEL'S DYNAMIC RANGE NAMES allow this bar chart to accommodate variable ranges.

Creating a dynamic range name is similar, except that the formula you use to define the name calculates a range reference (usually with the help of the OFFSET function) instead of a number, allowing the range in question to vary in size. To illustrate how dynamic range names can save time, consider a familiar spreadsheet problem: making a graph expand or contract to fit a range of values that frequently varies in size.

One of my clients, who works for an HMO, is an excellent case in point. She uses Excel 5.0 to prepare bar charts that compare how often clinical teams fail to charge patients for tests or procedures. Because each team may have omitted a different set of charges, the worksheet varies in length when she analyzes different teams. Linking the graph series to a dynamic range name allows the graph to refer to the appropriate set of cells even when the sheet changes size. A simplified version of the graph appears in FIGURE 1.

The workbook contains two dynamic range names to identify the graph labels in column A and the data values in column B of the ChargeGraph sheet. The range name Xdata refers to =OFFSET (A5,0,0,COUNTA($A:$A)−4,1), where the OFFSET function calculates the range address that contains labels for the graph's *x* axis, starting at cell A5; these labels refer to the type of procedure being tracked. The COUNTA function determines the number of rows in the range, a number equal to the number of entries in column A, less 4 for the labels in A1, A3, A4, and A9. The second range name, ChargeData, refers to =OFFSET(B5,0,0,COUNTA($B:$B)−3,1), which performs a similar calculation for the charges in column B that comprise the graph series.

Instead of referring directly to cell addresses, the bar chart is linked to the two range names. To create the link, I double-clicked the chart to edit it. The SERIES formula appeared in the formula bar at the top of the screen, and I edited it to read =SERIES(,GRAFNAME.XLS!Xdata,GRAFNAME.XLS!ChargeData,1). This formula tells the graph to use the dynamic range names to locate the cells containing its labels and values. Since the range names track the varying sizes of the relevant ranges, the graph does, too.

Dynamic range names take some forethought to set up, but they're an excellent, low-maintenance tool for handling ranges that change size frequently.

the labels. (In 1-2-3 formulas, a double quote denotes the start or end of a text string. To put an actual double quote into a text string, use two consecutive double quotes within the double quotes that start and end the text string.)

Now, unless you have 1-2-3 4.0 for Windows, you use /Print to export the delimited strings into a text file: Select */Print • File*, type an appropriate file name, and press **<Enter>**. Then choose *Options • Margins • Left* and enter a zero to suppress the blank spaces that would otherwise appear at the beginning of each line. Select *Other • Unformatted* to suppress the top and bottom margins, then *Quit* to return to the print menu. Select *Range* and highlight all the formulas (make sure that your print range is wide enough to include the entire text string). Finally, select *Go*, and you're all finished.

1-2-3 4.0 users are in luck: You can skip the /Print directions and just select *File • Save*, then *Text*.

By Richard Scoville

Richard Scoville is a contributing editor for PC World *and a software training consultant based in Chapel Hill, North Carolina.* Spreadsheets *welcomes your questions (see page 12 for contact information).*

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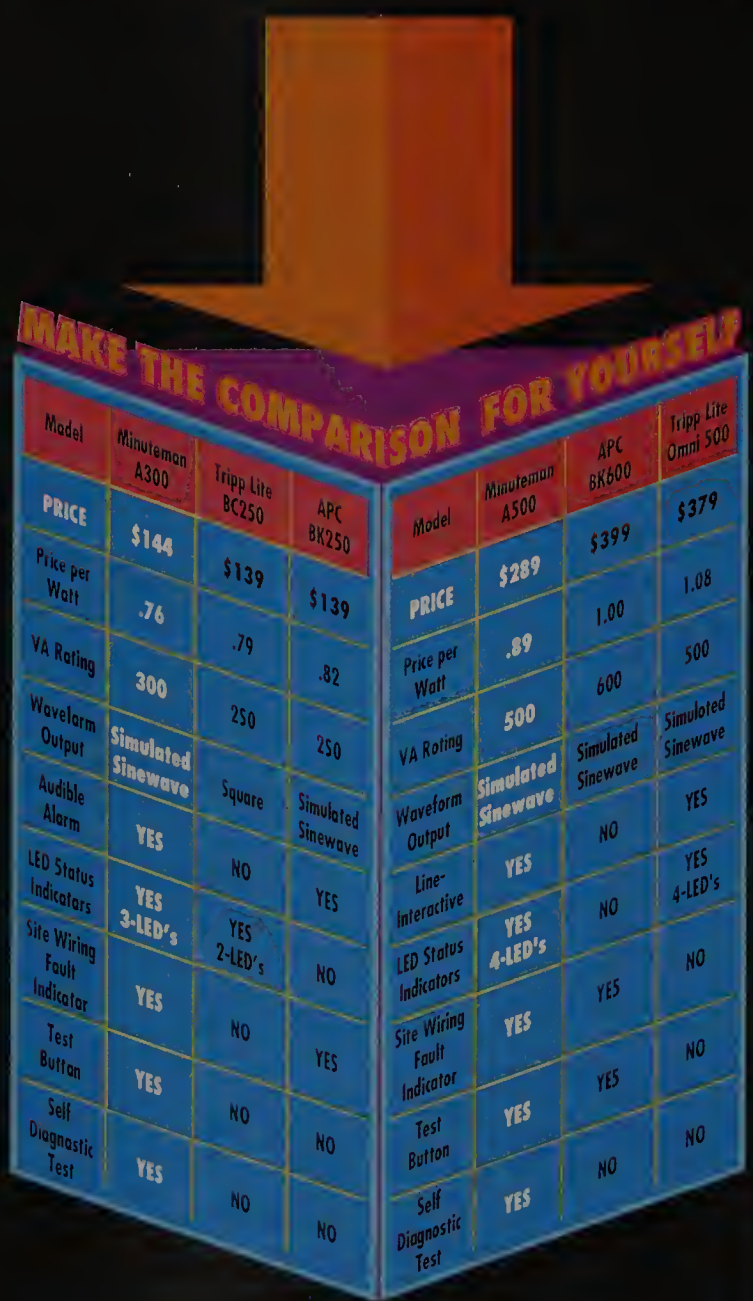

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WORD PROCESSING Q & A

Smart Drag and Drop in WinWord 6.0

Q Whenever I drag and drop a sentence within a paragraph using Word 6.0 for Windows, the spacing at the beginning or end of the sentence gets messed up. This happens even if I select the two spacebands I put between sentences—one space still gets left behind. How do I get WinWord to carry the selected spaces with the rest of the sentence?
Rick Haley, Anacortes, Washington

A WinWord has a new feature called Smart Cut and Paste. When Smart Cut and Paste is turned on (which it is by default), WinWord automatically adds or deletes spaces, as it deems necessary, when you drag and drop the sentence to a new location. That's great, and the feature can be a real time-saver. However, WinWord assumes that you place only one spaceband after a period, even though you like to use two. WinWord blithely formats your text the way *it* thinks is correct.

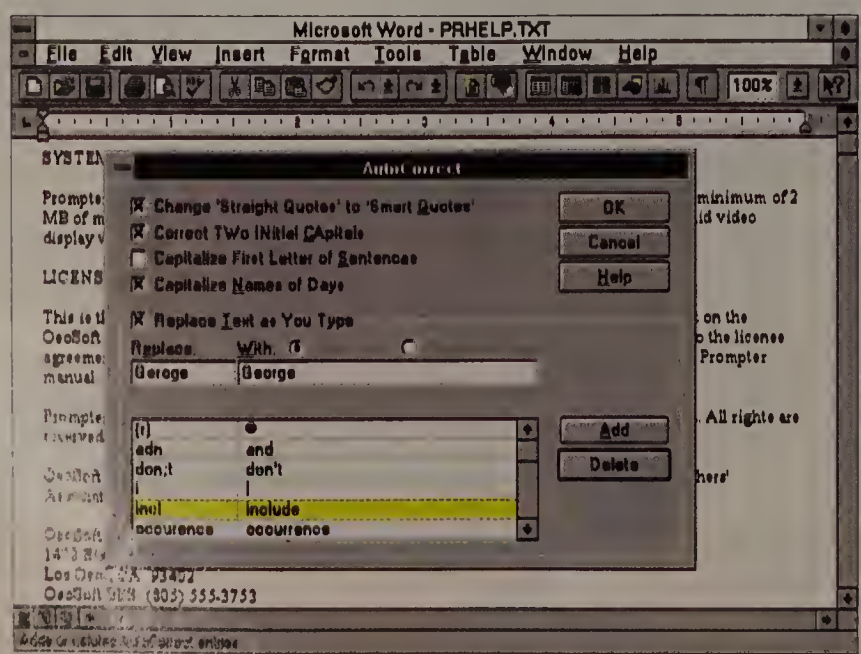
Since you're unlikely to break the habit of using two spaces between sentences, you should just turn off Smart Cut and Paste. To do so, select *Tools • Options*, click the *Edit* tab in the Options dialog box, and unmark the *Use Smart Cut and Paste* check box. Then click *OK* to make this the new default. From now on, WinWord will insert exactly the text and the spaces you select during drag-and-drop editing.

Winnowing WinWord's AutoCorrect

Q I really like WinWord 6.0's AutoCorrect feature, which fixes common spelling errors as I type. Whenever I run a spelling check and find a misspelled word, I just click the AutoCorrect button to add the word to my list. I've added hundreds of spelling errors to the small list that came with the program. Lately, however, I've been getting strange results. Sometimes when I type a correctly spelled word, AutoCorrect substitutes a different word. Also, Word seems slower now when I type. How can I fix this?
Jessica Wilson, Boston

A You're right—AutoCorrect is one of WinWord's most useful features, especially for those of us who commonly mistype the same words over and over again. (I use it to replace *Geroge*, a common error for me, with *George*.) But it's best to use the AutoCorrect list only for simple typographical errors you make frequently, rather than adding every misspelling the spelling checker finds. In this case, your AutoCorrect list has grown out of control—it's become too long and has some incorrect entries. Because WinWord has to check the entire list of words each time you press the <Space> bar, a long list slows down your typing.

The solution is to trim the AutoCorrect list. To do this, select *Tools • AutoCorrect*. In the AutoCorrect dialog box, scroll through the list of entries, checking each one to make sure it really is a common misspelling and that the correction is accurate and doesn't create a conflict (like replacing *to* with *too*). Remove inappropriate entries by clicking either word and then clicking *Delete* to remove the entry. To avoid typing slowdowns, limit your list to no more than 100 entries.



TRIM WINWORD 6.0'S AUTOCORRECT LIST by weeding out unnecessary or incorrect entries; performance should improve.

WinWord 6.0 Keyboard Format Painting

Q Word 6.0 for Windows lets you copy character formatting from a previously formatted block of text to other text by selecting the formatted text, clicking the Format Painter icon, and selecting the new text you want to assign the same format. That's fine, but I don't want to use the mouse all the time—I prefer keyboard shortcuts. Is there a way to get the same effect without taking my hands off the keyboard?
Alexis Wagner, San Francisco

A Sure. As with almost every operation, WinWord offers a keystroke shortcut for copying character formatting, including fonts, font sizes, boldfacing, italics, and other text attributes. In some ways, it works even better than using the mouse. Here's what to do:

Select all or part of a block of text that contains the formatting you want to copy (only the formatting from the first character of the selection will be copied). Press **<Shift>-<Ctrl>-C** to copy the selected formatting to a special clipboard. To apply that formatting, select the target text, then press **<Shift>-<Ctrl>-V**.

You can apply the copied formatting to other sections of text; the formatting remains available until you select and copy formatting from another block.

To copy paragraph formatting using this technique, be sure to include the paragraph marker at the end of both the original selection and the target selection when you highlight the text.

Opening Old WordPerfect Documents

Q I recently acquired a copy of WordPerfect 6.0 for Windows, and I am having a terrible time converting documents created in WordPerfect 5.1 for DOS to the new format. When I load

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an old document, the status line says, 'Conversion in progress'; but when the process is complete, the document shows up scrambled and filled with strange characters. This is a disaster. I thought WordPerfect 6.0 would at least be able to read files from older versions. How do I get at my old files?
Walter C. Frank, Berkeley, California

A You've fallen prey to a significant bug in the initial release of WordPerfect 6.0 for Windows. That release has trouble converting documents from version 5.1 if the older files use fonts other than the default. Instead of making a reasonable conversion of fonts, the program substitutes characters from the Symbol font, leading to the garbled results you describe. I can give you a quick, temporary fix you can use for the time being, but you really need to contact WordPerfect and get the company to send you a free copy of the 6.0a interim update.

Until the update arrives, just select the entire garbled document by pressing **<Shift>-<Ctrl>-<End>** right after you open it. Then press **<F9>** to call up the Font dialog box (or click the *Font* icon on the button bar), and select a new font for the text. That should restore the document to a normal appearance. Be sure to save the document, though, or you'll lose these changes.

Slow Cursor in WPWin 6.0a

Q Is there any way to speed up the painfully slow cursor movement in WordPerfect 6.0a for Windows? I have come to dread those all-too-frequent slowdowns when I need to use the cursor keys to move within a line or between lines in a document. Please help me get back up to speed—since upgrading, I feel like my life is going by in slow motion!
Steven E. Colburn, Largo, Florida

A Under some circumstances in WordPerfect 6.*x* for Windows, the cursor seems to slow to a crawl when you press a cursor key or hold down the <Backspace> or <Delete> key. This happens most frequently in complex documents, such as multicolumn newsletters, or in text adjacent to graphics.

I have a partial answer for your question, but it won't fix things completely. The easiest way to deal with the slowdown is to use your mouse to position the cursor. Just click where you want the cursor to be—it's almost instantaneous. Although moving your hands from keyboard to mouse isn't always convenient, it's the only solution to this puzzling problem in the program.

A more permanent remedy may be coming. WordPerfect Corporation is aware of the cursor slowdown problem (thanks to reports from users) and is working on a solu-

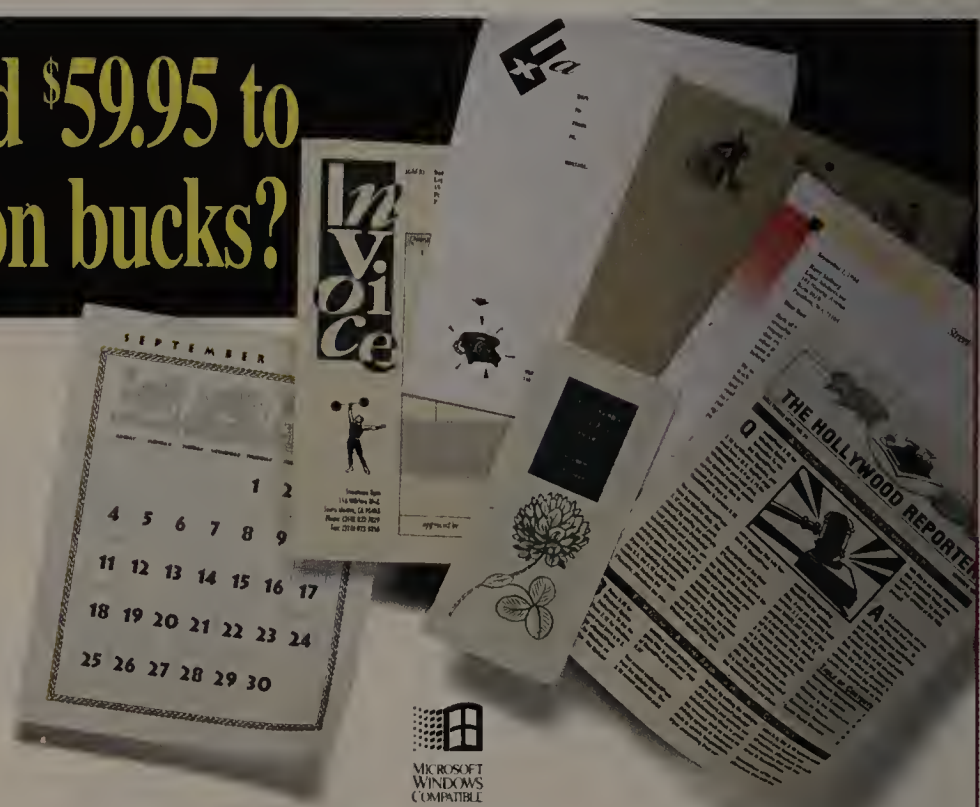
USER GROUP TIP

Click Tricks in WPWin

In WordPerfect for Windows, double-click a word to select it, triple-click to select a sentence, and click four times to select a paragraph.

David Weil
Long Beach IBM Users Group

Q. Would you spend $59.95 to look like a million bucks?



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tion. A second interim version is in the works, but the company had not announced a date for its release at this writing.

Ami Pro Envelopes with HP's DeskJet 550C

Q I use Ami Pro 3.0 and a Hewlett-Packard DeskJet 550C printer. I've been trying for days to print envelopes with the program's File•Print Envelope command, but no matter how I set things up, the envelopes don't print correctly. Sometimes they print upside down, and sometimes the printer feeds blank envelopes. I've tried every setting I can think of, and I got the latest printer driver from Hewlett-Packard, but I still can't get the envelopes to print right. Any suggestions?
Neil K. Riddock, Norfolk, Virginia

A What a problem! I have a 550C too, but I never used it for printing envelopes from Ami Pro until I got your letter. When I did try it, I ran into the same trouble you describe. I did a little digging and found a solution. The same steps will work for all HP DeskJet printers, as long as you're using the 4.*x* drivers from Hewlett-Packard.

1. Select *File•Printer Setup* and make certain your DeskJet 550C is selected as the default printer and that it's set for 8½-by-11-inch paper. (Don't select any of the envelope paper sizes.)

2. Back in Ami Pro, load the document containing the address and select *File•Print Envelope*. When the Print Envelope dialog box appears, make sure the correct envelope size is selected, then click *Options*.

3. In the Print Envelope Options dialog box, set Orientation to *Landscape* and Envelope feed position to *Right*. Then click the *Adjust* button.

4. In the Print Envelope Adjustments dialog box, change the settings as follows: In the Return Address section, select *Left* and set the value in the box below to **1.25**. In the Recipient Address section, select *Left* and set the value to **1.00**. (These settings adjust the envelope text to compensate for some of the DeskJet's quirks.) Click *OK* twice to get back to the Print Envelope dialog box.

5. Now load envelopes into your printer exactly as instructed in the DeskJet's manual, except for one thing: Change the orientation of the envelopes. The open flap of the envelope should face up and be on the left. (This is the exact opposite of Hewlett-Packard's recommendations.)

6. Finally, click *OK* in the Print Envelope dialog box, and your text will print correctly on the envelope.

If you think that sounds like a lot of hassle, you're right. Fortunately, you only have to change these envelope printing settings once. From now on, Ami Pro will default to the new values you've set, so all you have to do is load envelopes before giving the File•Print Envelope command. Finally, if your Print Envelope dialog box doesn't have an Options button, call Lotus Word Processing Division (800/343-5414) and ask for the upgraded Print Envelope disk.

By George Campbell

George Campbell is a contributing editor for PC World. *He can be reached on PC World Online as PCW George.* Word Processing *welcomes your questions (see page 12 for contact information).* ■

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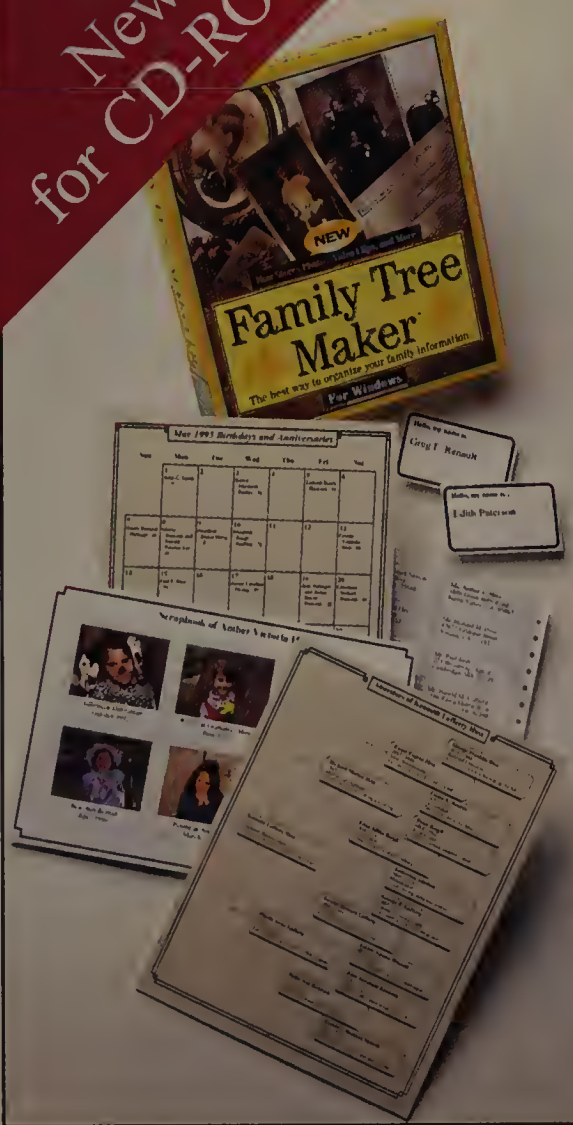

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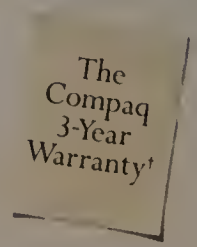

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WINDOWS Q & A

More Lines in DOS Windows

Q I like to run my DOS applications windowed in Windows, but I want to display more than 25 lines of text in them. I can't figure out how to do that. Picking a smaller font for my DOS windows doesn't help. What will?
George Carstairs, Jackson, Wyoming

A Not all DOS applications permit you to customize screen dimensions, but for those that do, a quick edit of your SYSTEM.INI file should solve the problem. First, make a copy of SYSTEM.INI in case something goes wrong. Then, in either File Manager or Program Manager, choose *File•Run*, type **SYSTEM.INI**, and press **<Enter>**. Go to the section labeled [Nonwindowsapp], where there may be a line that begins with 'ScreenLines='; change it to read **ScreenLines=43** (or add this line if it isn't there). If your screen and eyes can handle it, you might try something like **ScreenLines=50**. Now save the file and restart Windows. Your DOS prompt windows and some DOS programs should now display dozens of lines of text. Unfortunately, other DOS applications will remain unaffected.

Tripping Over <Alt>-<Tab>

Q I use the <Alt>-<Tab> shortcut to switch among running applications. But if I go too far or change my mind, I have to cycle through several windows all over again. Isn't there an easier way?
Olinda Clarke, Amherst, Massachusetts

A If you press <Alt>-<Tab> too many times and pass the application you're trying to go to, simply press **<Alt>-<Shift>-<Tab>**. This combination reverses the direction. If you change your mind while doing the <Alt>-<Tab> two-step, simply keep holding down the **<Alt>** key while pressing **<Esc>** to cancel the operation. You'll return to whichever application you started in.

Putting Minimized Icons in Their Place

Q I usually center my wallpaper, but then it gets blocked at the bottom by all of those minimized icons. Most of my bit maps aren't wide enough to fill the whole screen, so I want Windows to position the minimized icons on either side of the desktop. Is there any way to do this? I have looked for an answer for a long time, but to no avail.
Rudy Phan, PC World Online

A You're not alone, Rudy. Unfortunately, it appears that enabling users to put the icons anywhere but along the bottom is a low priority for programmers in general and Microsoft in particular. Windows doesn't offer a way to set where an icon goes, but you can create a Recorder macro that opens an application and puts its icon where you want it.

In Program Manager, set an application to run minimized: Select the icon, press **<Alt>-<Enter>**, and check *Run Minimized*. While you're there, select a shortcut key. Then click *OK*.

Next you start Recorder and choose *Macro•Record*. Name the macro, assign it a keyboard shortcut, and make sure the Record Mouse option is set to *Ignore Mouse*. Click *Start*, and you're recording the macro.

Press **<Alt>-<Tab>** repeatedly until you are at Program Manager, then press the application's keyboard shortcut to launch it. Hold down the **<Alt>** key and tap **<Esc>** (not <Tab>) several times until the minimized application is active—it should still be minimized. Press **<Alt>-<Space>** to display its system menu, then **M** for Move. Use the cursor keys to move the application to either side of the screen. When the icon is positioned where you want it, press **<Enter>**. Then press **<Alt>-<Space>** again and **R** to restore it to normal size. Click the Recorder icon to end recording.

Click *Save Macro*, then choose *File•Save* in Recorder to save the macro to a file. That's it. You've got one application that will always minimize to the same place—if you launch it from the macro and eschew Task Manager's Arrange Icons button. You can then repeat this process for other applications.

The problem with this approach is that you're forced to launch your applications with keyboard shortcuts. This means you could end up with a lot of keystroke combinations you can never use in applications when Recorder is running. In addition, you have to be careful not to set two icons to land on the same spot (and Recorder is none

Windows Toolbox

Windows shells and tool bar launchers are a dime a dozen. But WinLaunch 4.0 does something the others don't: It lets you control the location of minimized icons. You can configure it to arrange icons on the top, bottom, left, or right of the screen and to add icons from left to right, right to left, top to bottom, or bottom to top. And if a program doesn't remember its size and position, WinLaunch whips it into shape. WinLaunch can even snap your program to the space between its tool bar and your minimized icons. The brainchild of Russell E. Holcomb (CompuServe address: 70062,2236), WinLaunch is free. And it's available as WLAUNC.ZIP on PC World Online and other online services.

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menus, title bars, text in SYSEDIT.EXE	WIN.INI	[windows]	systemfont=	
menus, title bars, text in SYSEDIT.EXE	SYSTEM.INI	[boot]	fonts.fon=	Unpredictable. Use systemfont= in WIN.INI.
text in Notepad, Cardfile	SYSTEM.INI	[boot]	fixedfon.fon=	
applications using the OEM character set, such as Clipboard with View • OEM Text checked	SYSTEM.INI	[boot]	oemfonts.fon=	
icon labels	WIN.INI	[desktop]	icontitlefacename=	Accepts scalable fonts.
text in Windows Help, Print Manager	WIN.INI	[fonts]	MS Sans Serif=	Unpredictable. Best to leave alone.

FIGURE 1: CHANGING YOUR SYSTEM FONT SETTINGS. Before you can monkey with your system fonts, you need to know what line in which INI file changes what font.

too precise about recording location). Finally, the macro behaves unpredictably if the program is already running. On the positive side, while recording the macro you can customize each application's window size and position.

By far the best solution is to run, don't walk, to PC World Online and get WinLaunch, a handy little utility that takes care of all this. For more information, see this month's "Windows Toolbox."

System Fonts Made to Order

Q I inherited a large-screen monitor from someone upstairs, but I haven't been issued anything better than an old VGA video board to run it on. Consequently, everything on my screen is huge. Is there any way I can shrink the text on the menus, icons, and so on?
Hugh Arden, Eugene, Oregon

A The easy way to squeeze more type (or anything else) on screen is to change your screen resolution to 800 by 600, or even 1024 by 768. But your video board doesn't allow for that possibility, so you'll have to change your system fonts instead. Readers who want bigger, more readable text can also use this technique to change system fonts.

Naturally, Windows doesn't make this easy. First, except for icon titles, Windows accepts as system text only nonscalable bit-mapped fonts, which come in a limited number of sizes. Most Windows bit-mapped fonts use the extension FON, though four scalable fonts—named MODERN.FON, ROMAN.FON, SCRIPT.FON, and WINLD.FON—also use that extension.

There are six system font settings in your WIN.INI and SYSTEM.INI files, each affecting a different part of the Windows interface. Some of these settings have quirks you need to know about (see **FIGURE 1**). For full details on customizing icon labels, see "Easy on the Icons," *Windows Q&A*, April 1993.

Fortunately, you can get lots of mileage out of two of these settings: The systemfont= statement in WIN.INI's [windows] section sets the font for menus and title bars, while the fixedfon.fon= statement in SYSTEM.INI's [boot] section does likewise for text in Notepad and Cardfile. To get a small but readable font, I recommend **SSERIFE.FON** for the systemfont setting and **SMALLF.FON** for fixedfon.fon (see the middle example in **FIGURE 2**).

For best results, stick to the fonts mentioned here or others intended for these uses. Any font named something like *xxxxx*FIX.FON is fine for Notepad and Cardfile, while a font with a name like *xxxxx*SYS.FON will do for menus and title bars. In either of the groups, 8514*xxxx*.FON files are the largest (a great eye-saver) and EGA*xxxxx*.FON is the smallest.

Before you try to install any of these fonts, make sure that they're in your WINDOWS\SYSTEM directory. If not, get out your original Windows floppy disks and decompress the font files with the EXPAND.EXE utility in your WINDOWS directory: From a DOS prompt, you will type something similar to **EXPAND A:\SMALLF.FO_ C:\WINDOWS\SYSTEM\SMALLF.FON**.

When you've got the fonts you need, make backup copies of WIN.INI and SYSTEM.INI, then open the originals by selecting *File•Run* in either Program Manager or File Manager, typing **SYSEDIT**, and pressing **<Enter>**. Modify the font statements of your choice, save the files as you exit SYSEDIT, and exit and reenter Windows to see how your new fonts look. If Windows doesn't start, one of the fonts is incompatible; restore the INI files from your backup copies.

Although most applications gladly accept these changes, a few might revolt. For example, some fonts can cause screen-redraw problems in Norton Desktop for Windows' Desktop Editor. You can fix this problem by choosing *Options•Customize* within Desktop Editor and specifying either *ANSI Fixed Font* or *OEM Fixed Font* for that application. Visual Basic, on the other hand, simply won't tolerate much system font creativity.

By Scott Dunn

Scott Dunn is a contributing editor for PC World *and coauthor of* 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992).* Windows Q&A *welcomes your questions (see page 12 for contact information).*

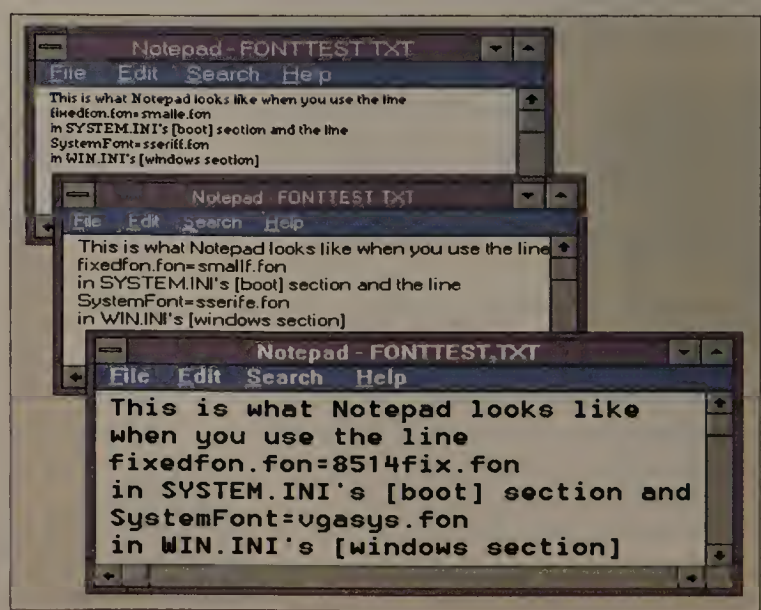

FIGURE 2: FONT MAKEOVER. Changing your fonts can make a big difference in how Windows looks.

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DATA MANAGEMENT Q & A

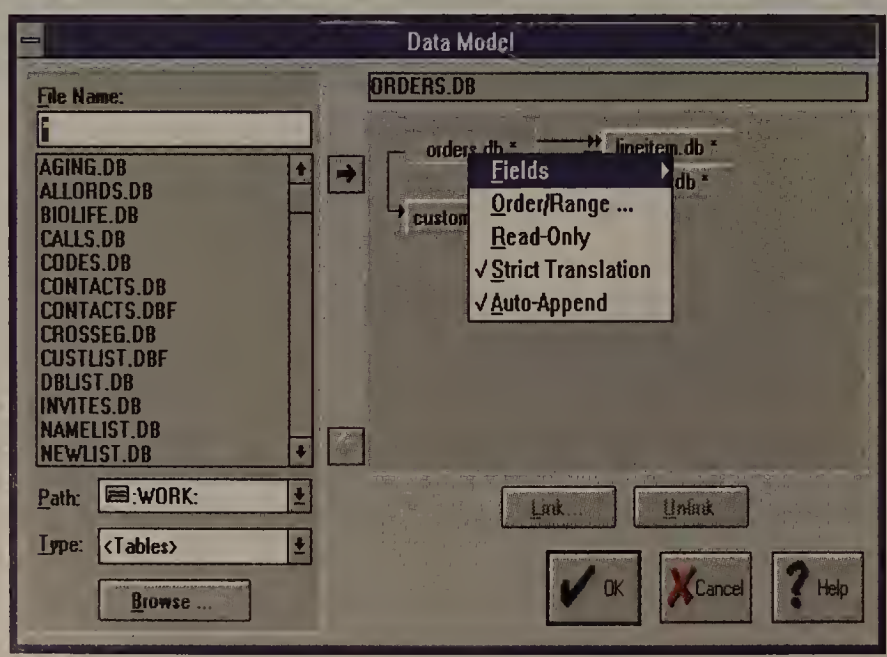
Auto-Appending Records in Paradox for Windows

Q I've created a custom form in Paradox for Windows. In order to add a new record in the form, I have to press <Insert>. According to the Help system, there's something called the Auto-Append property that adds a new record automatically whenever I move off the last field of the current record. But I can't find this property anywhere. Where is it?

Francis X. Carroll, Horsham, Pennsylvania

A Auto-Append does this, but only in a tabular or multirecord form. In a single-record form like the one Paradox creates with Quick Form, turning on Auto-Append enables you to insert a new record by pressing <Page Down>, but not by moving off the last field.

And yes, the Auto-Append property is hidden away. You'll find it in the form's Data Model dialog—if you know where to look. While you have your form up in design mode, click the Data Model SpeedBar button or select *Form•Data Model* to bring up the Data Model dialog. On the left side of the dialog box is a list of available tables; on the right side is a diagram of tables already in the form. Right-click the appropriate table in the diagram; a properties menu for that table pops up. Lo and behold, that's where you'll find the Auto-Append option.



YOU'LL FIND PARADOX'S AUTO-APPEND FEATURE, which lets you add new records easily, in a properties menu of the Data Model dialog box.

Access-Paradox Table Lookups

Q I'm using Access 2.0 to enter expense records into a Paradox table, and I can't get it to do table lookups. I've attached two Paradox tables to an Access database: EXPENSES.DB, the data table, and EXPCODES.DB, the lookup table. When I come to the Type field while entering data, a list of options taken from EXPCODES should pop up, but it doesn't. I've tried adding a validation rule in the Table Design dialog, but Access says I can't do this for a Paradox table.

Sam Stockton, Greenwich, Connecticut

A Access won't let you add validation rules directly to an attached Paradox table, but you can add a pick list to such a form. First, if you don't already have a form for that table, use the Form Wizard to create one: Click the *Form* tab, then the *New* button. In the resulting dialog box, select your table from the drop-down menu and click *Form Wizards*. When you are asked what kind of form you want to create, double-click on *AutoForm*. Access will then create a simple form with all of EXPENSES's fields.

The new form will open in a window. To make room for your pick list, click the *Design View* icon or select *View•Form Design*, then click the Type field and press **<Delete>** to erase the field and its label.

Now you'll add a combo box in the field's place. To do this, click the Combo Box tool bar button and position your mouse where the Type field was. Then drag your mouse to create a new field object. This will open the Combo Box Wizard—a series of dialog boxes you move through via Next and Back buttons. In the first dialog box, select *I want the combo box to look up the values in a table or query.* In the next one, select *EXPCODES* as the lookup table. You can make your own choices in the next two dialog boxes, which control how the pick list will look. In the fifth dialog box, select *Type* as the value to store in EXPENSES.DB. In the sixth, select *Store that value in this field* and pick *Type* from the drop-down list of fields in EXPENSES.DB. In the final dialog box, enter a label such as **Type** for your combo box. When you click *Finish*, the combo box will be in your form.

You'll want to limit the values you can enter into the combo box to those already in EXPCODES. Right-click the new field, choose *Properties*, then set the Limit To List property to *Yes*.

To test the feature, select *View•Form* or click the Form view tool bar button. Be sure that you save the form when you close its window or you'll lose your work.

Changing Reports in dBASE 5.0 for DOS

Q I just got a copy of dBASE 5.0, and I'm trying to change some reports I designed with dBASE IV. The trouble is, I can't locate them. I can bring them up with File•Open, although it's a bit of a hassle since dBASE 5.0 won't look for dBASE IV's FRG report format. But when I do, I get a window full of programming code instead of a report design. Where can I find my design? I don't want to program anything.

Donna Hopper, Denver

A The new screen you see when you start dBASE 5.0 is the Developer's Desktop, oriented toward programmers. However, it's easy to switch to the familiar dBASE IV Control Center. Select

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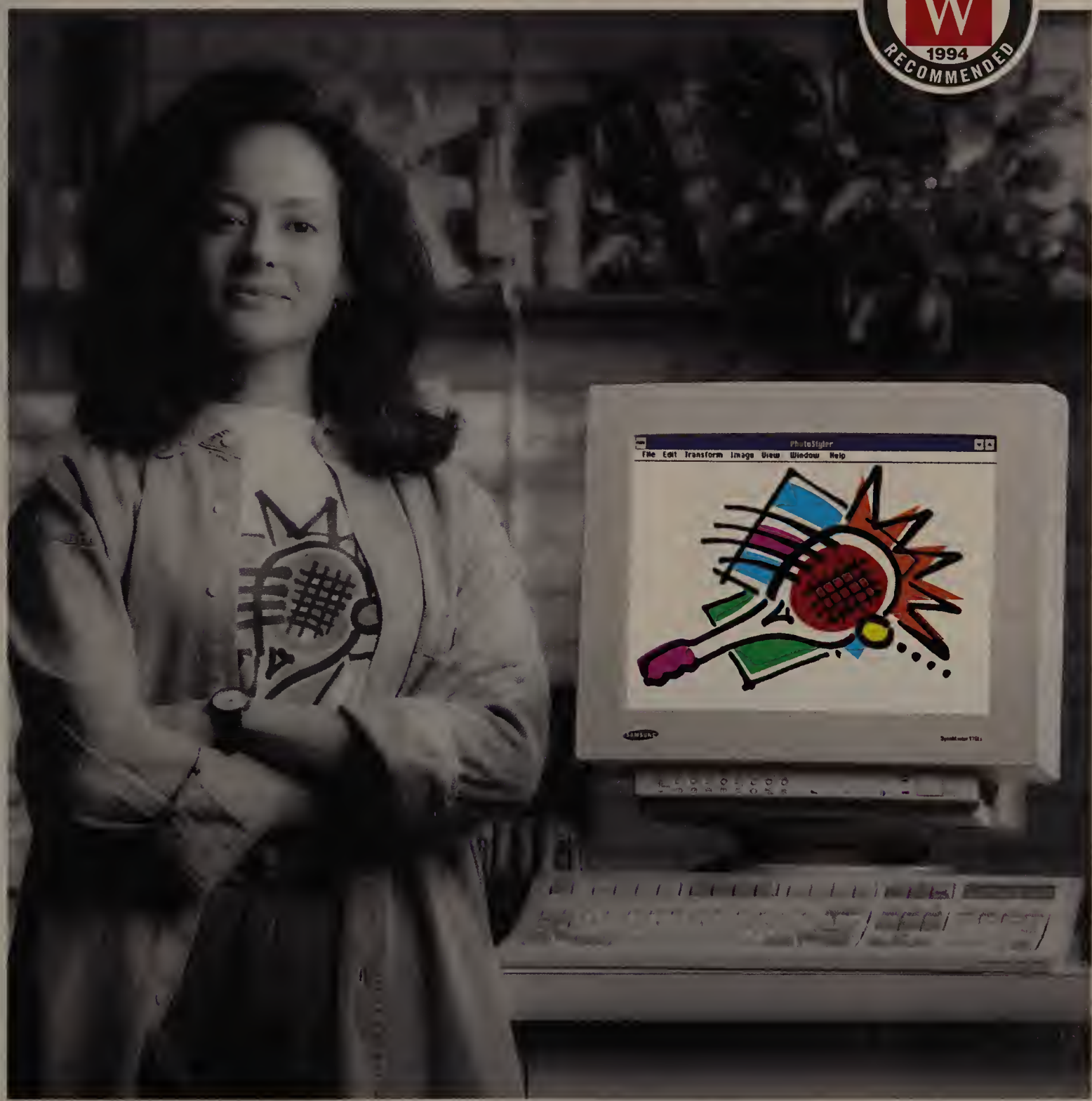

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Window•Control Center or press **<F2>**. If you're working in the same directory you used with dBASE IV, your old reports and other files will be where you expect them, ready to work in the old way. To return to the Developer's Desktop, select *Exit•Exit to command window.*

Copying an Approach View for New Data

Q I'm using Approach 2.1 to work with a dBASE file of test scores, and I've created a view file with quite a few reports in it. Now I'd like to use the same reports with a different dBASE file. Is there a quick way to copy a view file to a different database so I won't have to re-create all my work?
Daniel Lee, Atlanta

A The best thing to do is attach a copy of your new data file to a copy of your existing view file. It's easy, at least if the new database has pretty much the same fields as the old one. First, open your view file and select *File•Save As.* In the resulting dialog box, enter a unique name for the new view file, and in the Databases section, select *New Data.* When you click *OK*, Approach brings up the Save Database As dialog box, where you enter a new name for your data file; do not use the name of any existing data file. Next, click *OK* to open the new view file. You'll see that it has no records.

You might be wondering why we're creating a new data file when you're trying to attach the view to an existing one. It's simple: You can't combine an existing view file with an existing data file, but you can import information into a new data file attached to a new view file. With the new view file open, select *File•Import Data,* then enter the name of the DBF file you wanted to attach to your view. Approach opens a Field Mapping dialog box where you can assign fields in the existing data file to fields in the new, empty one. If your data files have the same structure, just click *OK* to close the dialog. You should now see your new view file with data in it.

After you go through this process, don't ever enter data into the DBF file you imported from. If you do, you'll have to import all over again to make sure you're working with up-to-date data. If you do all your data entry in your new view, this shouldn't be a problem.

Floating Report Footers in dBASE

Q When I print a report in dBASE IV, I would like the statement "No Further Entries" to print immediately following the last line of the last page. How can I set up a report layout to do this?
James Carroll, America Online

A When you design your dBASE report, make sure to put your ending statement in the line just under Report Summary instead of on the last line of the layout. The last line is reserved for whatever you want to print at the bottom of each page.

By Celeste Robinson

Celeste Robinson is a contributing editor for PC World *and the author of* The Paradox 5.0 for Windows Handbook *(Random House Electronic Publishing, 1994).* Data Management *welcomes your questions (see page 12 for contact information).* ■

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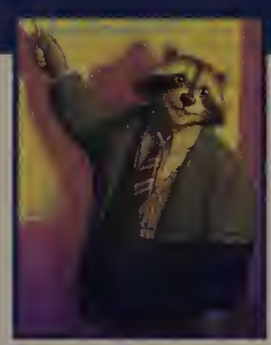

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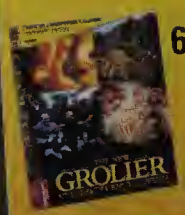

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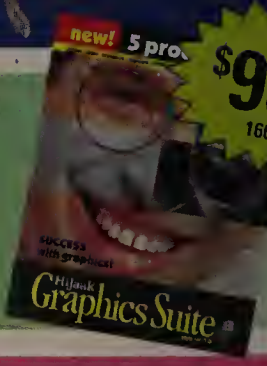

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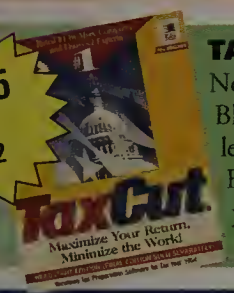

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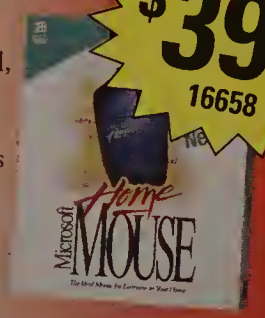

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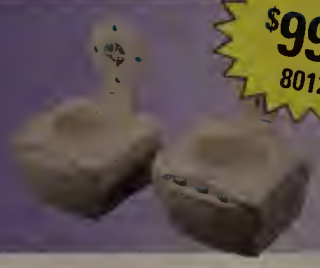

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Fonts on the Fly With PageMaker

Q It takes forever to find the fonts I need when formatting PageMaker 5.0 documents. To change a single character in a paragraph from, say, Americana to Wingdings, I have to scroll all the way through the lengthy font list. Got any tips for fast font changes?
Dan Benjamin, Orlando, Florida

A Using PageMaker's Type Font menu to change fonts for a character or word can really eat up time, particularly when you have to go through a zillion fonts to get from *A* to *W*. Fortunately, I've got a great shortcut that lets you change the font for a selected character or word by simply typing the name of the font you want to use.

First, select *Window•Control palette* to display PageMaker's control palette, then click the Character button, if necessary, to change to character view. Select the Text tool on the control palette, and highlight the text that you want to reformat. The name of the current font appears in the control palette's font list box. Insert the cursor in front of the font name in the list box.

Now type the first few letters of the font you want to change to—for example, **Win** for Wingdings; it doesn't matter if you use upper- or lowercase letters. PageMaker automatically fills in the rest of the font's name for you. The uniqueness of the font name and its alphabetical order will dictate how many letters you actually have to type.

To implement the font change, you either click *Apply* on the control palette or press **<Enter>**. Sure beats scrolling through that endless font list box, eh?

By the way, this technique works in layout view and in the story editor window, but you need to be in layout view to see the actual formatting on screen.

Fancy Text and Logos With CorelDraw

Q I'm trying to create a logo with characters that are black on top and white on the bottom. I have access to CorelDraw 3.0, Microsoft Publisher 2.0, and PageMaker 5.0. Will one of these packages do what I want?
Jerel Peterson, Cando, North Dakota

A You can create plenty of striking type designs with PageMaker and Publisher using solid black and solid white characters, but if you want two-tone characters, you definitely need a draw program such as CorelDraw. Although version 3.0 doesn't have all the fancy features that 4.0 and 5.0 do, you can still use it to create your two-tone type design. Here are the basic steps to create the type shown in **FIGURE 1**; you can adapt this technique to your specific job.

1. Open a blank document, and select the Text tool. Click anywhere on the page, type the text for your logo, and select *Edit•Edit Text*. Choose the font, size, and type style that you want, and click *OK*. (In Figure 1, the font we used is 100-point Bahamas Heavy.)

2. Select the Zoom tool and then the *1:1* button to get a closer look at your text. Select the Rectangle tool, and draw a rectangle to cover the top half of your text. Click the black square in the color palette (at the bottom of the screen) to give this rectangle a black fill.

3. With the rectangle still selected, click the Pick tool and then hold down **<Shift>** while clicking the text to select it, too. If you've done this correctly, the status line at the top of the screen should read '2 objects selected on Layer 1'. Select *Edit•Copy* to send a copy of both objects to the Clipboard for later use.

4. With the text and rectangle still selected, choose *Arrange•Combine* to convert them into a single object. Click the white square in the color palette to give this combined object a white fill (it will become virtually invisible).

5. Select *Edit•Paste* to place a second copy of the rectangle and text over the white version, then select *Arrange•To Front* to place the copy on top. Click an empty part of the page to deselect the items. Now click the text to select it (making sure you haven't also selected the rectangle), click the *X* in the lower left corner of the screen to give the text no fill, and use the right mouse button to click the black square in the color palette to give the text a black outline.

6. Now select just the rectangle, and choose *Arrange•To Back* to move it under the text.

7. Take a look at the result. You should now have a logo that's divided into black and white parts. If the outer edges of the lower copy are visible, reduce the rectangle's size.

8. To finish, use the Pick tool to draw a marquee around the logo, and select *Arrange•Group* to combine all the parts into one object. You also may want to add a border or other graphics around the logo, resize or rotate it, and so on.

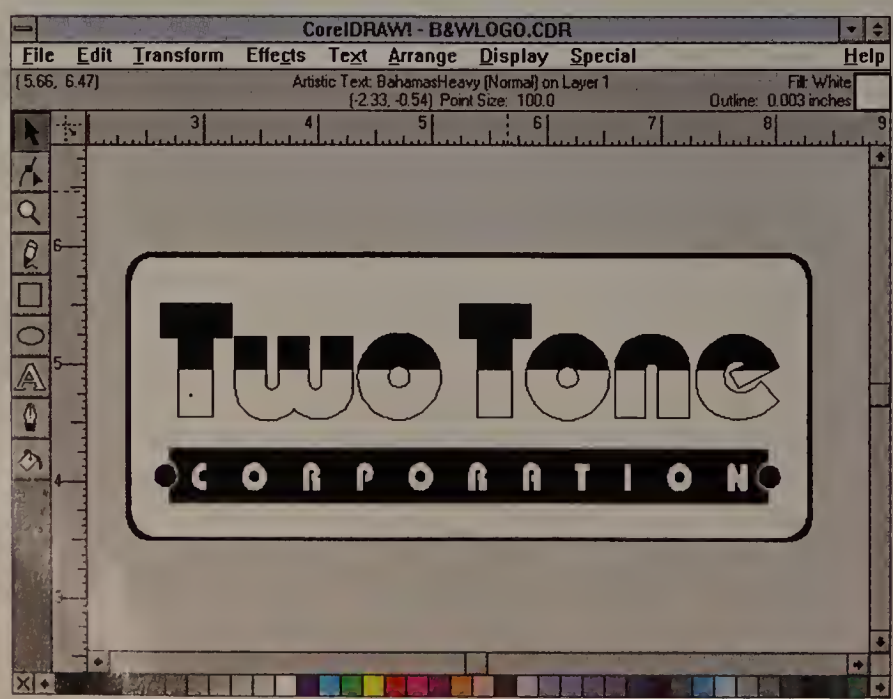

FIGURE 1: CREATE TWO-TONE TYPE IN CORELDRAW by using the program's flexible drawing features.

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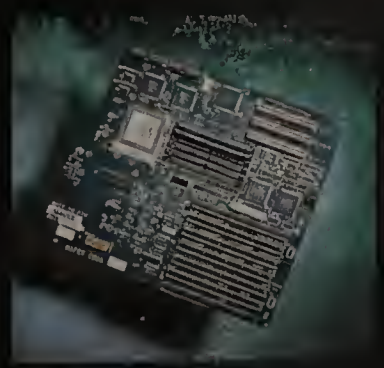

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Better Harvard Screen Shows

Q Is there any way to slow down the transition effects between slides during an on-screen presentation using Harvard Graphics 2.0 for Windows? The transitions are so quick on my 66-MHz Gateway 486 (with VESA local bus graphics) that some are barely noticeable.

Joseph Richmeyer, De Soto, Missouri

A I wish I could say it ain't so, Joe, but I'm afraid you've found one of Harvard Graphics' most glaring omissions: no transition speed control for on-screen presentations. While some presentation packages allow you to control the timing for various transition effects, Harvard Graphics lets you control only the amount of time each slide is on screen between transitions. And unfortunately, the latest version of the program, 3.0, still suffers from this limitation. However, I do have some tips that may be helpful.

First, in case you haven't already noticed, some of Harvard's transition effects take longer to perform than others, so you could try sticking with the slower ones. Specifically, three types of transition effects—fade, rain, and scroll—unfurl at a more leisurely pace than blinds, wipes, and others.

To use these prolonged transition effects, open your presentation and select *File•ScreenShow•Edit ScreenShow Effects*. In the resulting dialog box, select your slide transition effects in the usual manner. In the Draw effect and Erase effect drop-down lists, select any of the slower effects (Fade, Fade down, Rain up, Rain down, Scroll up, Scroll down, Scroll left, and Scroll right) for each slide in your presentation. One good technique is to select a complementary pair of transition effects—such as Rain up and Rain down—to draw and erase each slide. After you've clicked *OK* to save your transitions, you can preview your presentation and determine which effects work best by selecting *File•ScreenShow•From beginning*.

Another way to handle the speeding-screen-show syndrome is to slow down your PC's operating speed before showing an on-screen presentation. This causes everything, including your transition effects, to run slower. Many PCs have a turbo switch on the front panel that you can turn off to slow down the system; your Gateway should have one. On my 486, Harvard's transition effects take almost twice as long to run with the turbo switch turned off. Note: If your PC doesn't have a turbo switch, you may be able to control the system speed through the setup software. Check your manual.

If these two tricks don't slow your presentation down enough, I can only suggest you serve a pot of double-strength java to help your audience keep pace with the show.

By Richard Jantz

Contributing Editor Richard Jantz is an electronic publishing and presentations consultant in Berkeley, California. Publishing & Presentations *welcomes your questions and makeover candidates (see page 12 for contact information).* ■

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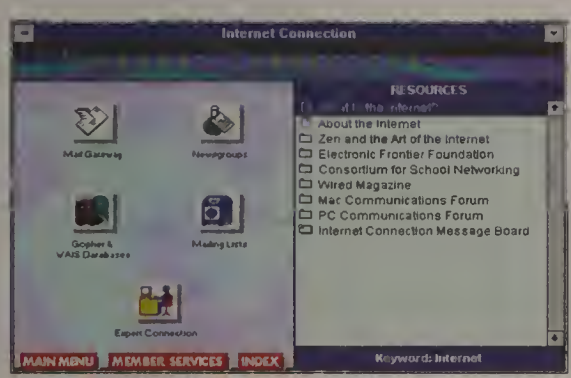

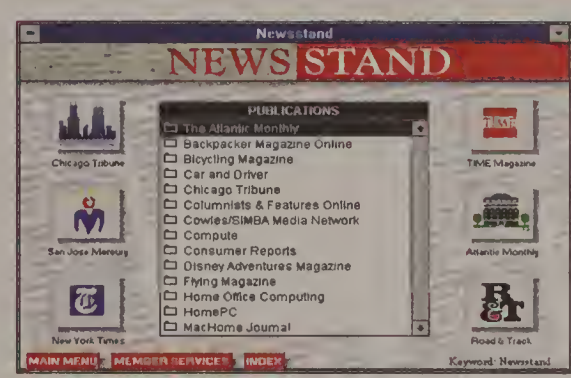

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COMMUNICATIONS Q & A

Why Some Online Customers Pay More

Q I live in a small city (about 116,000 people). When I want to log in to CompuServe or any other big online service, it's a long-distance call. It bugs me that I have to pay more to connect to online services than people in large metropolitan areas. What does it take to get local phone numbers for the major online services in my community?
Sean Darcy, Hernando, Florida

A We posed your question to representatives of several major online services. While all agree that it's unfair to charge you more for access than someone in, say, Miami, the unspoken attitude seems to be that you should resign yourself to your fate, that unequal access fees are—for the time being at least—the way the online world works, and you can't do much about them.

"There are different costs associated with dialing different lines," says Pierce Reid, spokesperson at CompuServe. From Hernando, Florida, you can dial CompuServe long-distance and pay the service's regular access rates—but then, you also pay your long-distance carrier's charges. Or you can dial CompuServe's 800 number, which will cost you $8.70 per hour on top of other CompuServe fees. As a third possibility, you can dial into CompuServe via SprintNet or Tymnet (which may be a long-distance call), for which you'll be billed an additional $1.70 to $11.70 per hour.

There is a glimmer of hope. Reid says if you can find a sizable business in your community that wants to connect its office network to CompuServe, then CompuServe will be more than happy to rush out with a coaxial cable, and you'll have a free, local dial-in number in no time. The same goes if CompuServe should suddenly be flooded with new customer inquiries from residents of your community.

Other services, such as America Online and Delphi, are at the mercy of their long-distance access providers, namely SprintNet and Tymnet. Unfortunately, these access providers install local nodes only where there's sufficient demand. One online service flack, who asked to remain anonymous, impishly suggested that you and your neighbors get together, write petitions, and storm the offices of SprintNet and Tymnet. No one could tell us whether that tactic has ever worked.

More on Separating Voice and Fax Calls

When you share your business phone with a fax-modem, keeping fax and voice calls separate can be a problem. We discussed this in the July column ("Separating Fax and Data From Voice"), and mail on the subject has poured in ever since.

In that column we recommended installing two telephone numbers on the same line, devoting the second number to the fax-modem, and configuring that number to use a custom ring. Some readers confused this solution with installing two telephone lines on an existing phone line. While this latter scenario is technically possible, we were talking specifically about sharing two telephone numbers on a single telephone line.

If you do set up two numbers on one line, you'll need to install a routing device to identify incoming calls by their custom ring and then route them appropriately. Many readers wrote to recommend Command Communications' ComShare line of routers. Their big advantage: ComShare routers listen for sound bursts rather than for specific ring patterns. Depending on your phone company, your custom ring may be a single trill, a triple ring, or any of several other distinctive patterns. Because ComShare routers listen for patterns, they can recognize a wider variety of custom rings than similar devices that listen only for a limited set of ring patterns.

Command Communications offers four routers, ranging in price from $99.95 to $179.95. The reader favorite seems to be the midline CS550 model, priced at $129.95. It can connect to a phone, an answering machine, and a fax device, and it's programmable, so you can set it up to do things like call you at a specified remote phone number and notify you when a fax or answering-machine message arrives.

ComShare routers are available at OfficeMax, Office Depot, Best Buy, and MicroAge stores. Command Communications does not sell directly to the public, but you can call the company for the name of a store in your area that sells its products.

Finally, if you want to skip custom ringing altogether, or if you're on the road a lot using a laptop with a fax-modem, you might consider Delrina's new Fax MailBox service. For $9.95 a month, you can give clients a toll-free number they can dial to send you faxes. To pick up your faxes, you can call the same number at any time, from any place, and download the faxes to your fax-modem. You can use any fax software, and you never get a busy signal. In addition to the monthly subscription fee, there's a per-page charge of 50 cents for the first 10 pages, 45 cents for pages 11 to 49, and 35 cents for pages thereafter.

One online service flack impishly suggested that you and your neighbors get together and storm the offices of SprintNet and Tymnet.

- **Command Communications,** 800/288-6794
  Reader service no. 880
- **Delrina,** 800/232-9269
  Reader service no. 881

By Judy Heim

Judy Heim is a contributing editor for PC World *and author of the communications guide in* The PC Bible *(Peachpit Press, Berkeley, California, 1995).* Communications *welcomes your questions (see page 12 for contact information).*

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HARDWARE Q & A

The Last Drop of Hard Disk Space

Q I read with interest "The Best Way to Slice Drive C:" in your August column, where you noted that larger logical drives waste more space. I recently upgraded to a 540MB hard disk and configured it as one big drive. Am I really wasting 8K per file? And if so, how do I repartition my disk?
Ralph Brown, Chagrin Falls, Ohio

A Yes, you're really wasting 8K per file on average. If you had, say, 5000 files on your 540MB hard disk, you'd be wasting about 40MB, or approximately 7 percent of the total space available.

This waste, called *slack space*, is contained *within* the last cluster of each file. You can cut slack space by approximately 60 percent if you split your 540MB hard disk into two logical drives, provided one drive is less than 256MB. (For example, a 290MB drive C: and a 250MB drive D: would do the trick.) To create the two drives, you need to back up all your data, run DOS's FDISK (which destroys all data on your hard disk), format the new logical drives, and restore your backup. This sounds to me like too much work, but I have a feeling you really want to do this, so here's how.

First, don't try anything unless you've successfully experimented with backing up and restoring data using your backup utility. Then create a boot disk. Slip a blank (or expendable) floppy into drive A: and type **FORMAT A:/S**. When DOS is done formatting, copy FDISK.EXE and FORMAT.COM to the floppy. Now, with the floppy disk still in drive A:, reboot your system, and when you get to the A:> prompt, type **FDISK**.

Press **3** to select *Delete partition or Logical DOS Drive* from the Fdisk Options menu and press **<Enter>**. In the next menu, enter **1** and press **<Enter>** again. You'll be prompted for the hard disk's partition number and volume label; if a label exists, type it in and press **<Enter>**. As a final confirmation that you want to obliterate everything, press **Y** and then **Enter**. Now press **<Esc>** to return to the Fdisk Options menu.

Next, enter **1** to select *Create DOS partition or Logical DOS Drive*. In the subsequent menu, enter **1** again for *Create Primary DOS Partition*. You'll be asked whether you want to use the maximum available size for a primary DOS partition (that is, one big C: drive). Enter **N**, and FDISK asks you to give the number of megabytes for the primary partition. Enter **290**.

Press **<Esc>** to return to the Fdisk Options menu. Select *Set Active Partition* and enter **1**. Press **<Esc>** again and select *Create Extended DOS Partition;* you'll be prompted for the extended partition size. Press **<Enter>** to accept the default—250MB or so—then press **<Esc>** once again. Next, you'll be prompted to create logical drives within the extended partition. Enter the maximum space available for the logical drive (which may be a little less than 250MB) and press **<Esc>** one last time.

Now you need to format your new C: and D: drives. Enter **FORMAT C:/S** to make drive C: bootable and ready to store data. Then enter **FORMAT D:** (without the /S) to prepare your D: drive. Finally, restore your backup to the C: drive; if you have more than 290MB of data, you'll have to selectively restore some of it to the D: drive.

A CPU Upgrade—or Downgrade

Q I recently purchased an AMD Am486DX2-66 chip to upgrade my 486DX-33 PC. Installation was a snap, but I had to disable the 256K secondary cache to make my system work. Am I losing a lot of speed by disabling the cache? How can I restore full operation?
Arnie Bunkley, Kalamazoo, Michigan

A AMD's Am486DX2-66 isn't designed to be a retail upgrade chip, so there's no guarantee this chip will work in your system—or didn't the person who sold you the chip mention that? With the disabled cache, overall system performance may fall as far as 25 percent below that of a DX2-66 PC using a 256K secondary cache.

AMD sells only to distributors and manufacturers of PCs and motherboards, so it's unusual that you got hold of the chip to begin with. My guess is that nobody will be very enthusiastic about solving your problem—if it can be solved at all. I advise you to try to get your money back. The moral: Don't swap CPUs unless the new chip is specifically sold as an upgrade.

At this writing, Intel is the only company that sells upgrade chips for 486DX-33 PCs. I suggest you call Intel's fax-back line at 800/525-3019 to find out if your system has been certified as compatible with Intel's OverDrive upgrade. If so, the chip should run in your system without problems, or Intel will refund your money

True, hardware problems with memory are relatively rare. But try telling that to the person whose PC is crashing and losing data.

The IDE-Versus-SCSI Debate

Q In the July *Hardware Q&A*, a reader asked if it was true that he couldn't install more than two IDE hard drives ("Too Many Hard Disks"). Your reply was "Yes, sort of," and you recommended a SCSI hard disk. Well, I have four IDE drives in my system, thanks to an IDE interface card from GSI, Inc. Why didn't you mention this approach?
Edwin Richer, Zephyrhills, Florida

A Okay, I'll fess up: I have been somewhat biased toward SCSI. I like the idea of being able to connect a whole variety of devices—hard disks, CD-ROM drives, scanners, tape drives—to a single SCSI interface card. But I must admit that SCSI devices sometimes simply refuse to work together.

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the system BIOS won't recognize more than two hard disks, forcing you to use a drive interface card that goes around the BIOS if you want three or more hard disks. A SCSI card works, but so does a new breed of IDE interface cards, such as those from GSI, Inc. (800/486-7800). For example, the 16-bit ISA Model 4C Accelerator Board, with a street price of about $140, enables you to connect up to eight IDE hard disks, and boosts throughput in the bargain. You can also create partitions up to 8.4GB, far larger than the IDE limit of 528MB.

Many new systems come with an Enhanced IDE BIOS, which provides features similar to those of GSI, Inc.'s offerings, including accelerated throughput and the ability to hook up to four Enhanced IDE drives to an Enhanced IDE interface built into the motherboard. To get performance benefits as well as partitions larger than 528MB, you need to match the system BIOS with an Enhanced IDE hard disk—and there are plenty on the market now.

I've also seen an increasing number of IDE devices, including CD-ROM and tape drives. If the number and variety of Enhanced IDE devices continues to increase, and if hooking up multiple Enhanced IDE devices turns out to be less hassle than chaining SCSI devices, maybe I won't be recommending SCSI so often.

Waiting for Memory to Check Out

Q When a PC powers on and does its memory check, what does it actually do? Does it check to see if the memory is "there," does it check for errors, or does it do nothing important? Is it safe to bypass the check, or should I wait for it to finish?
Todd Roeder, North Richland Hills, Texas

A Impatient, aren't we? I'd let the test run at least once a day, even though the check isn't necessary for your PC to recognize and use all the memory in your system. The test checks for errors—and you want know about any memory problems *before* you get into a work session, don't you? True, hardware problems with memory are relatively rare. But tell that to the person whose PC keeps crashing and losing data until the problem—a bad SIMM—finally emerges. With the help of manufacturer tech support, error codes at start-up can tell you which SIMM should be replaced.

If your system lacks *parity checking*—an error-checking scheme that tests your memory constantly using an extra bit per byte—then you should let the memory test run every time you turn on your system. At one time, all systems had parity checking, but the scheme is costly, and many system vendors have abandoned it, leaving the memory check at start-up the only time your PC checks for memory problems.

Your system manual should say whether your PC uses parity checking. Remember that 9-bit and 36-bit SIMMs have an extra bit per byte to support parity checking, while 8-bit and 32-bit SIMMs do not.

By Eric Knorr

Eric Knorr is a contributing editor for PC World *and the editor and principal author of* The PC Bible *from Peachpit Press.* Hardware *welcomes your questions (see page 12 for contact information).* ■

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STAR-DOT-STAR TIPS

Is It a CD-ROM Yet?

If you try to run a CD-ROM–based application without a disk in the drive, your computer will certainly display an error message and may even crash. Here's a utility program (CDREADY.COM) and a batch file (CDCHECK.BAT) that can check the status of your CD-ROM drive before you attempt to launch a program from it.

```
@ECHO OFF
ECHO Accessing CD-ROM drive...
CDREADY.COM %1
IF NOT ERRORLEVEL 1 GOTO CDokay
IF NOT ERRORLEVEL 16 GOTO CDinvalid
ECHO CD-ROM drive not ready
GOTO CDexit
:CDinvalid
ECHO Invalid CD-ROM drive letter: %1
GOTO CDexit
:CDokay
ECHO CD-ROM ready
GOTO CDexit
:CDexit
```

FIGURE 1: CDCHECK.BAT USES CDREADY.COM ERRORLEVEL values to branch to the right routines.

```
@ECHO OFF
ECHO Checking CD-ROM drive
C:\DOS\CDREADY.COM E:
IF NOT ERRORLEVEL 1 GOTO CDokay
IF NOT ERRORLEVEL 16 GOTO Invalid
ECHO CD-ROM drive not ready
ECHO (audio disk or no disk in drive)
GOTO Exit
:CDokay
ECHO Searching for \SCIKQ5.EXE...
IF EXIST E:\SCIKQ5.EXE GOTO RUNKQ5
ECHO ERROR: King's Quest V not in drive!
GOTO Exit
:Invalid
ECHO This is not a CD-ROM drive
GOTO Exit
:RUNKQ5
D:
CD \SIERRA
KQ5.BAT
:EXIT
PAUSE
```

FIGURE 2: KQ5CD.BAT CHECKS FOR THE RIGHT CD-ROM before attempting to use it.

CDREADY.COM finds out whether a CD-ROM is in the drive by trying to read the copyright notice on the disc. If there's an audio CD in the drive or if the drive isn't ready, the utility sets ERRORLEVEL to 30. If the drive isn't a CD-ROM drive (which can happen if you've furnished the wrong drive letter), you'll get ERRORLEVEL 15. If there's a CD-ROM in the drive ready to read, ERRORLEVEL is set to 0. The syntax for CDREADY.COM is CDREADY *drive*, where *drive* is the letter of the CD-ROM drive. For example, in order to check drive E:, use the command CDREADY E (you don't need to type a colon, but the program works fine if you do).

Because CDREADY.COM simply assigns a value to the ERRORLEVEL variable, you need to use it in a batch file that employs ERRORLEVEL to branch to an appropriate routine. Your batch file should always check for all three possible conditions and advise the user what to do next. You can use the batch file CDCHECK.BAT [**FIGURE 1**] as the basis for your own; it utilizes CDREADY.COM to display the status of the CD-ROM drive. You can also perform a more extensive test that additionally checks for a particular application's CD-ROM. The batch file KQ5CD.BAT [**FIGURE 2**] shows how to do this; it makes sure my eight-year-old son doesn't have trouble launching Sierra On-Line's King's Quest V.

Daniel A. Smith,
Follansbee, West Virginia

Editor's note: This is a useful and important utility, because MS-DOS has longstanding documented problems dealing with removable media. If no disc (or the wrong disc) is in a drive when the operating system needs it, you may experience lockups or errors.

To create CDREADY.COM, copy the script in **FIGURE 3** into a file called CDREADY.SCR, then enter the command **DEBUG < CDREADY.SCR**. CDREADY.COM will appear in the current directory.

Bypass Workgroups' Blowups

If you run Windows for Workgroups 3.11, you'll get the best performance with a large permanent swap file. Trouble is, if you have 32-bit File Access enabled and try to change the swap file settings, Windows will "GPF" [experience a General Protection Fault] and freeze. The work-around: Turn off 32-bit File Access (via the Enhanced icon on the Control Panel) and restart Windows. Once you've changed the swap file settings and restarted Windows, you can turn 32-bit File Access on again. Microsoft knows about this problem but says it won't be fixed until a future version of Windows comes out.

Stan Polinsky, Simi Valley, California

Editor's note: Turning off 32-bit File Access can solve many Windows for Workgroups 3.11 problems. Why? Because 32-bit File Access replaces the DOS file system with a 32-bit version that's not fully compatible with DOS. (According to DOS expert Geoff Chappell, author of *DOS Internals* from Addison-Wesley, 32-bit File Access fails to update certain data structures correctly and interferes with communication between certain programs and device drivers.) If you are debugging a Windows for Workgroups 3.11 system, this change should be one of the first tactics that you try if the system doesn't work properly with any DOS or Windows program—especially disk and compression utilities.

Don't confuse 32-bit File Access with 32-bit *Disk* Access, which has appeared in every version of Windows since 3.1 and doesn't cause the problem.

Pop Out of the Box

If you're tired of typing EXIT to shut down a Windows DOS session, here's a way to close DOS boxes with a single keystroke. First, add the line **DEVICE=C:\DOS\ANSI.SYS** to your CONFIG.SYS file;

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change the path if ANSI.SYS resides in a directory other than C:\DOS. (If you use a memory manager, you may want to load ANSI.SYS high using DEVICEHIGH or an analogous statement, or simply run your memory manager's optimizer after adding the ANSI.SYS line to CONFIG.SYS.)

Next, add the line **DosPromptExitInstruc=Off** to the [386Enh] section of the SYSTEM.INI file located in your Windows directory. (If the line DosPromptExitInstruc=On is already there, simply replace On with **Off**.) Then create the file **WEXIT.BAT [FIGURE 4]** in your Windows directory. Finally, use the Windows PIF (program information file) editor, found in Program Manager's Main program group, to open DOSPRMPT.PIF (also in the Windows directory). Then, in the Optional Parameters box, type the line **/k c:\windows\bat\wexit.bat** (replacing c:\windows with the path of your Windows directory if it differs). Exit Windows, reboot your computer, and restart Windows—<F12> now lets you exit instantly from a Windows DOS session started by DOSPRMPT.PIF.

Andres Berrios, Roseville, California

Editor's note: This tip lets you get out of a DOS box without having to type a command, and an ANSI.SYS programmable function key is the secret. The batch file also loads DOSKEY, a convenient TSR that allows you to repeat previous DOS commands easily (but it isn't necessary for programming the <F12> key). Berrios uses <F12> as the exit key for the DOS box, but this is a matter of personal taste. For consistency you may want to define <Alt>-<F4>—Windows' convention for closing windows—as the DOS box exit key. (It's harder to reach than <F12>, though, so you trade off ergonomics for consistency.) To use <Alt>-<F4>, replace the number 134 in the second line of the listing with 107, then change the message on the second-to-last line to read 'Press F4 to exit'.

```
n cdready.com
e 100 be 80 00 ac 09 c0 74 2c
e 108 ac 3d 20 00 74 fa 3d 43
e 110 00 7c 21 3d 5b 00 7c 08
e 118 3d 7a 00 7f 17 2d 20 00
e 120 2d 41 00 91 b8 02 15 bb
e 128 80 01 cd 2f 72 02 b0 00
e 130 b4 4c cd 21 ba 40 01 b4
e 138 09 cd 21 b4 4c cd 21 90
e 140 55 73 61 67 65 20 65 72
e 148 72 6f 72 0d 0a 24

rcx
4e
w
q
```

FIGURE 3: THIS DEBUG SCRIPT CREATES CDREADY.COM, which program-launching batch files can use to test a CD-ROM drive's state of readiness.

```
@ECHO ON
@PROMPT $e[0;134;"EXIT$_"p
@PROMPT [Windows]$p$g
@ECHO OFF
REM Load a copy of DOSKEY
C:\DOS\DOSKEY
CLS
ECHO Press "F12" to exit
ECHO.
```

FIGURE 4: YOU CAN EXIT WINDOWS' DOS BOX with a single press of <F12> if you start DOS using WEXIT.BAT.

Stop That Shuffling

If you frequently have to install Windows programs (or Windows itself), you may tire of shuffling floppies in and out of drives. Microsoft Office is particularly trying in this respect: It takes 31 floppy changes—plus long waits between them—to install the whole package.

Some day all large applications will come on CD-ROM, eliminating this problem. But since many applications aren't yet available in this form, and most computers still don't have CD-ROM drives, you can save time with the following technique. Use DOS's XCOPY utility to copy all the product's installation floppies to a single directory on the hard drive. Make that directory the current directory on that drive. Start Windows, and run the application's SETUP or INSTALL program from the directory you created. Installation should require no disk changes. If the computer's networked, create the directory on the server so you can perform multiple installations from the server.

Ron Swift, Nashville

Editor's note: Most Microsoft applications—and many from other vendors—are amenable to this technique. However, you may find a few that absolutely insist on being installed from floppies. (In fact, while you can install Microsoft Office 4.2 from a single directory, version 4.3 will give you trouble unless you use the administrator's installation program, SETUP /A.) I use this technique to install Windows so all the files that *aren't* installed right away—such as printer and display drivers—are always available on my hard drive. This eliminates the need to hunt for the Windows floppies when changing mouse, display, or printer drivers.

By Brett Glass

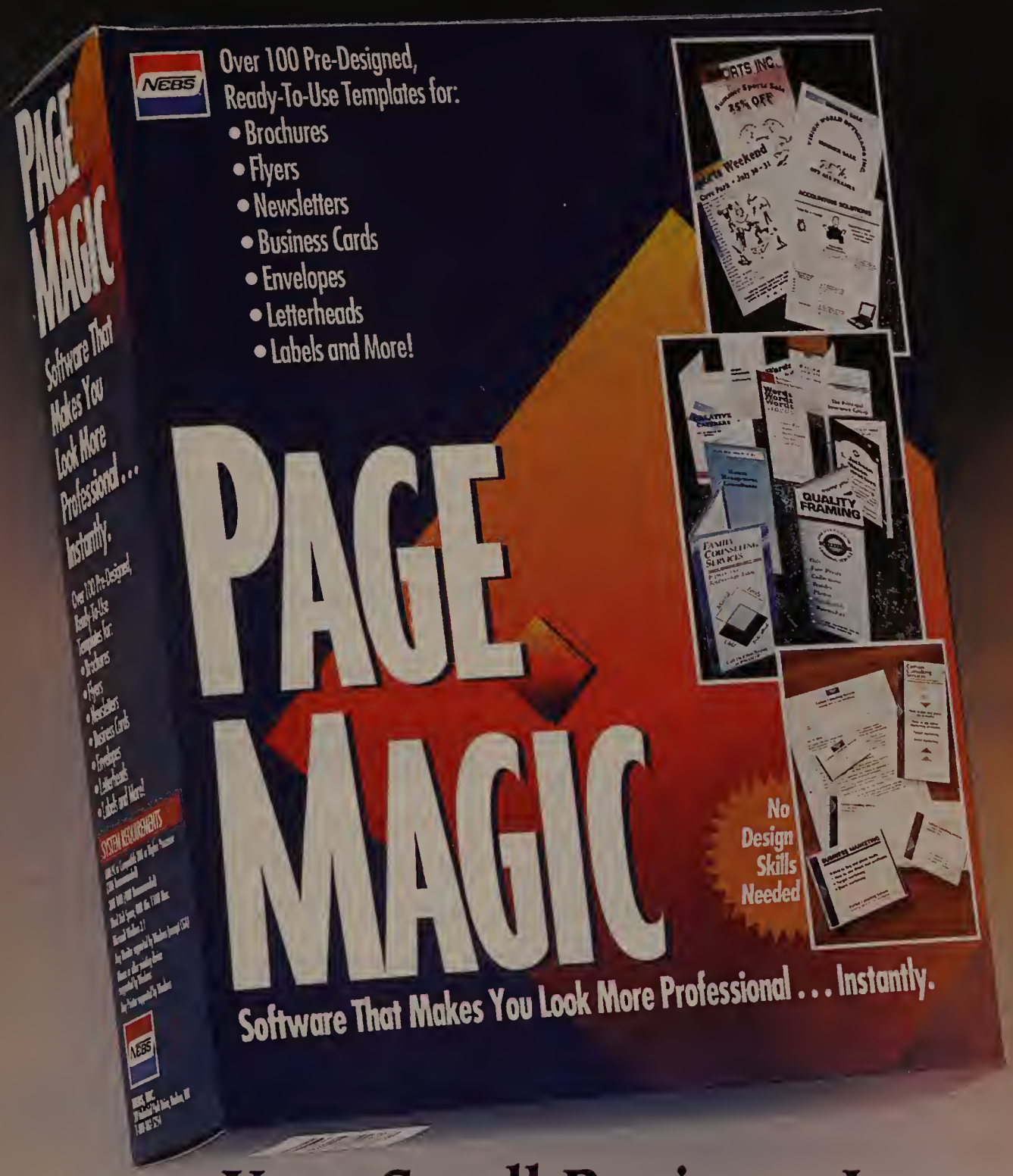
Brett Glass is a PC World *contributing editor.* Star-Dot-Star *welcomes your tips, macros, batch files, and short programs (see page 12 for contact information).*

USER GROUP TIP

Quick Viewing With Shareware's LIST

Viewing long DOS directory listings, even with the DIR command's /P switch, is difficult. But with the LIST shareware program, the job is easy. That's because LIST, a powerful text viewer, gives you the option to view, scroll through, and print piped text files using the switch /S. To use it, make sure LIST.COM is in a directory listed in your CONFIG.SYS's or AUTOEXEC.BAT's path statement, and type DIR *.* |LIST/S at a DOS prompt. LIST is available on PC World Online's Featured This Month as LIST.ZIP. After you've obtained it, you'll want to use it to look at any text file.

John Dubois
Long Beach IBM Users Group



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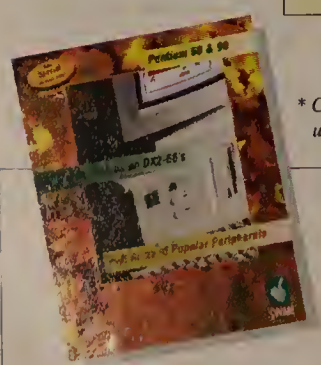

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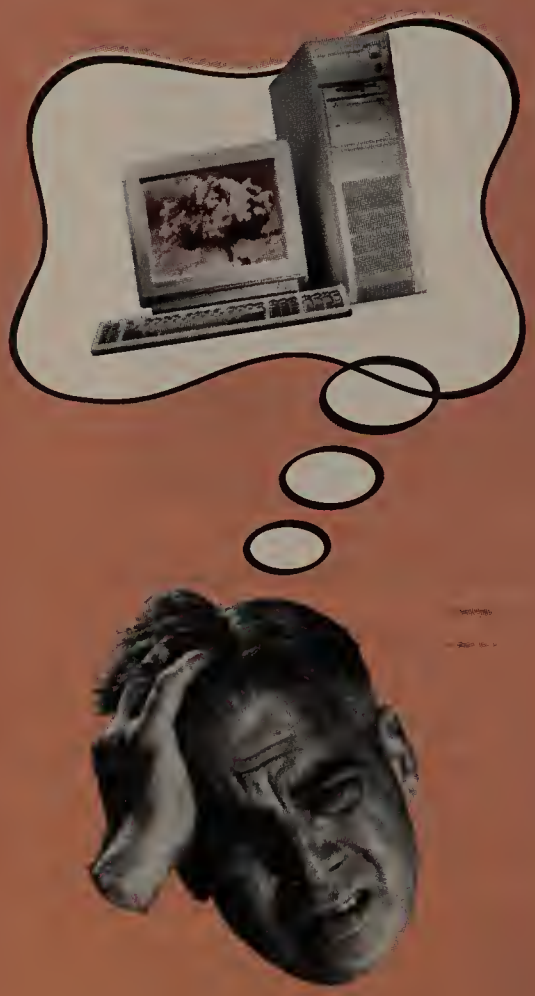

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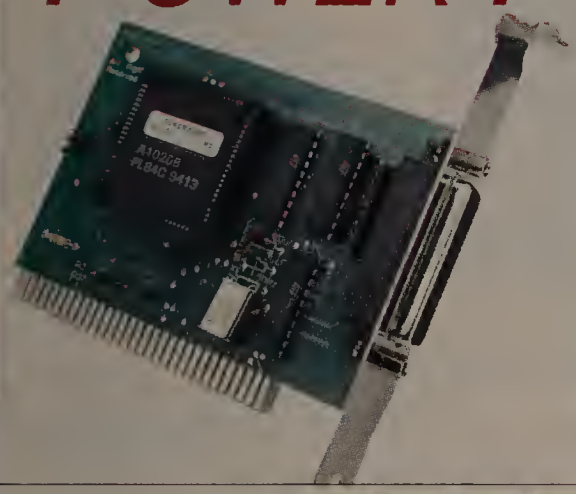

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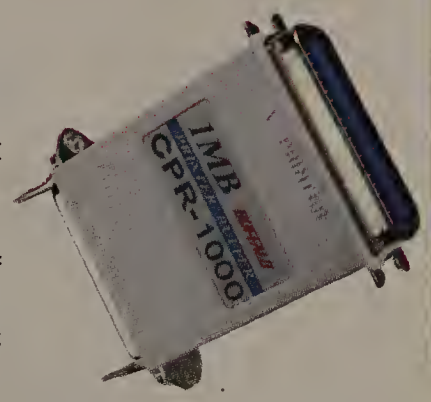

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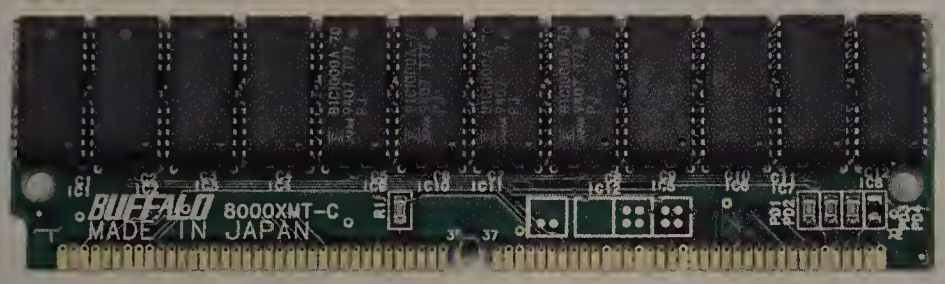

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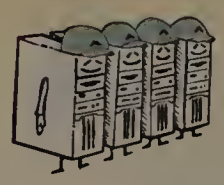

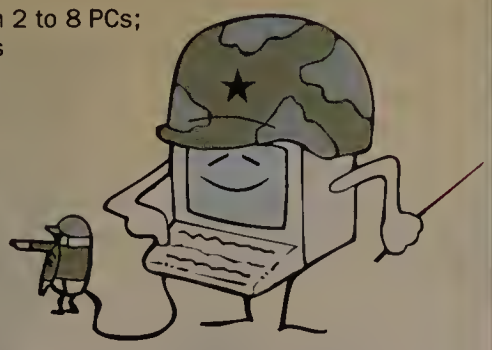

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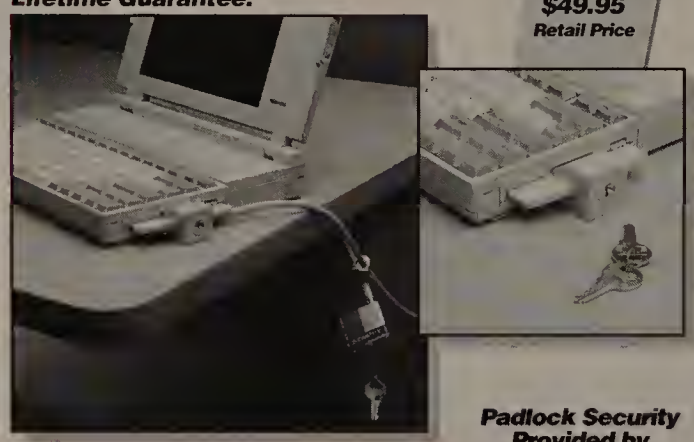

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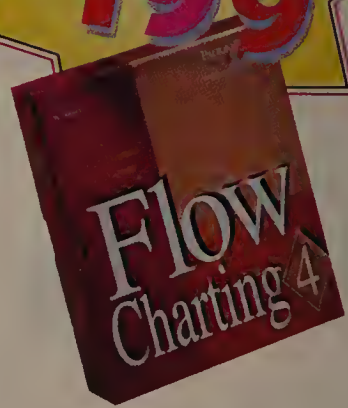

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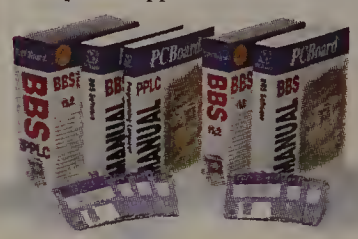

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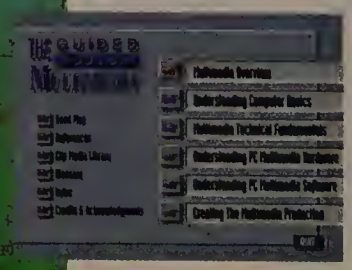

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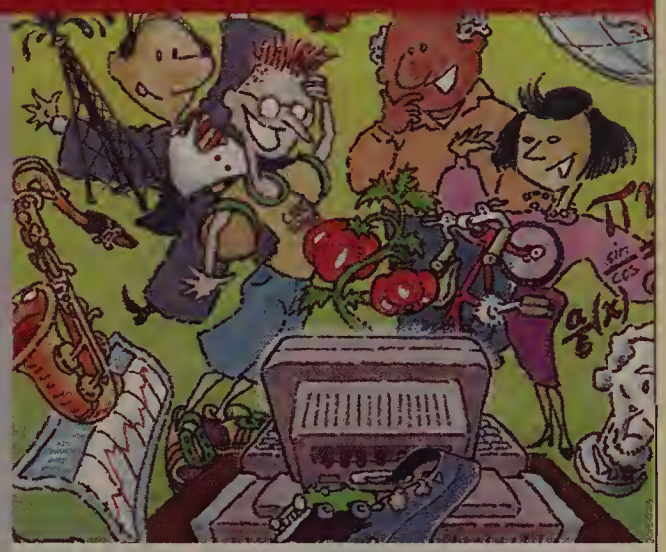

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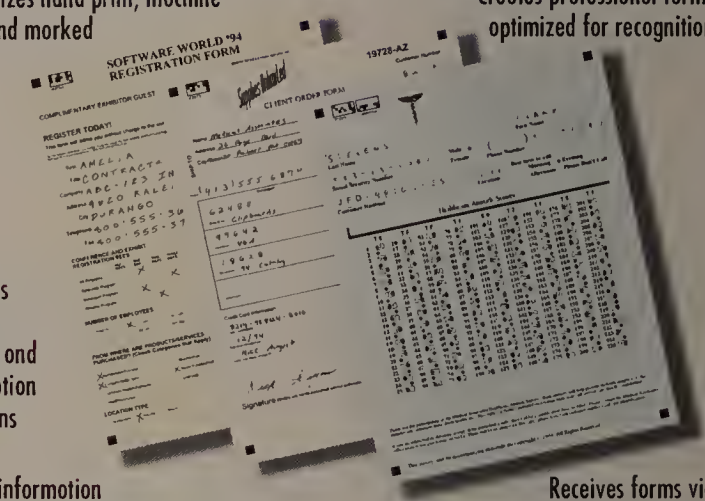

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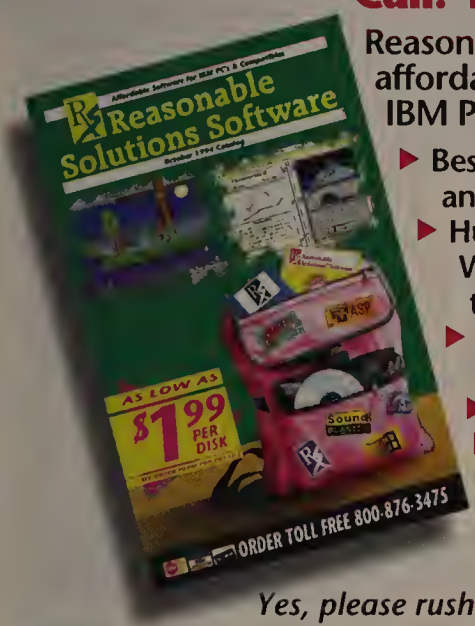

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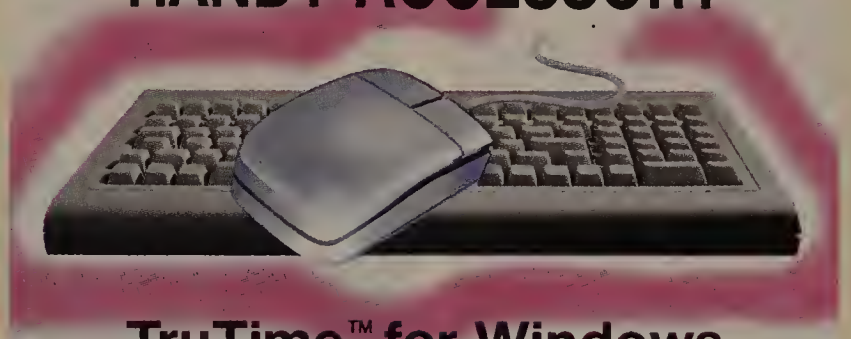

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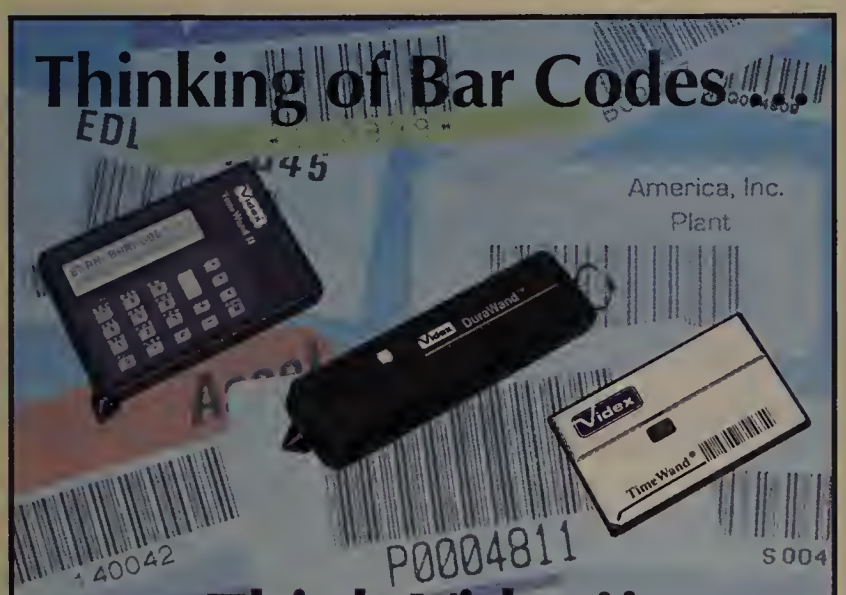

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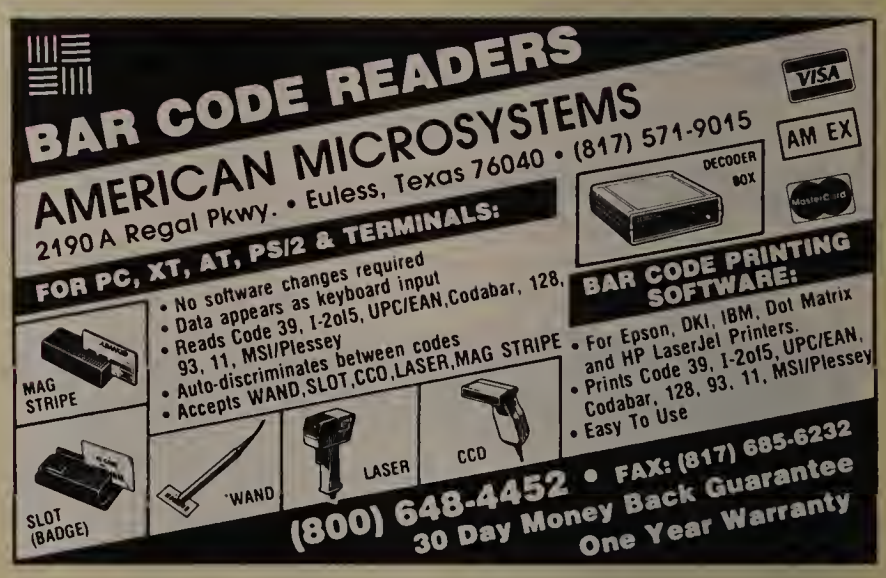

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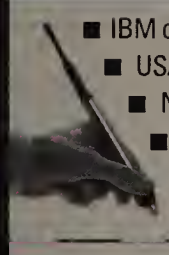

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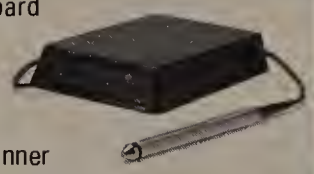

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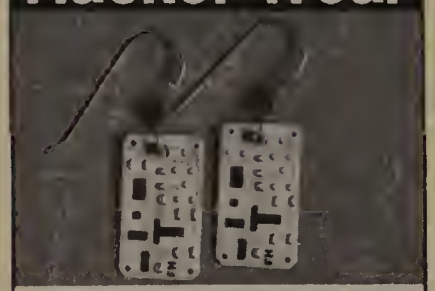

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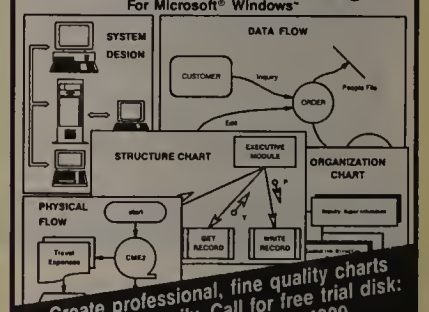

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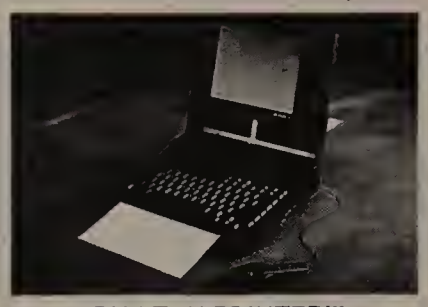

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MULTIMEDIA WORLD
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April 1994

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1994 MULTIMEDIA WORLD READERS' CHOICE FINALIST
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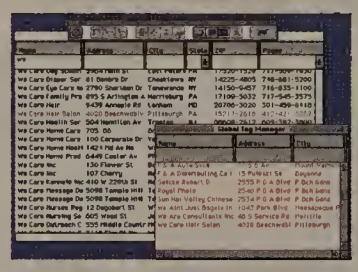
As soon as you try Select Phone,the Phonebook on CD-ROM, you'll be like a kid in a sand box. The first thing you'll probably key in is your own name (hey, everyone does). Then perhaps you'll try an old friend's name. Click on the little retriever dog icon. Bingo! You'll easily and quickly perform multiple, national lookups that even directory assistance, with their massive mainframe computers, can't do for you.

Custom search to match your exact specs.

When you open up Select Phone, you're offered eight different ways to locate someone. For simplicity, you only need to type in someone's name. If you don't know the full name, just type in a part of it and do what's called a *wild card search*. Let's say you can only remember the name was something like "Down." Type in DOWN* and you'll get all the Downs, Downes, Downeys, etc. Now use this incredibly powerful search function for your business. Say you're in Fargo and you sell products to a specific type of company, like dry cleaners. You just type in Fargo and "dry cleaner" or the SIC code and with a click bring up all the dry cleaners in Fargo (there are five).



Tag listings then download them to your own database, contact manager or word processor and move your business into high gear.

O.K. So it can search and find people. But you're in business to make money.

Picture a Phonebook on steroids.

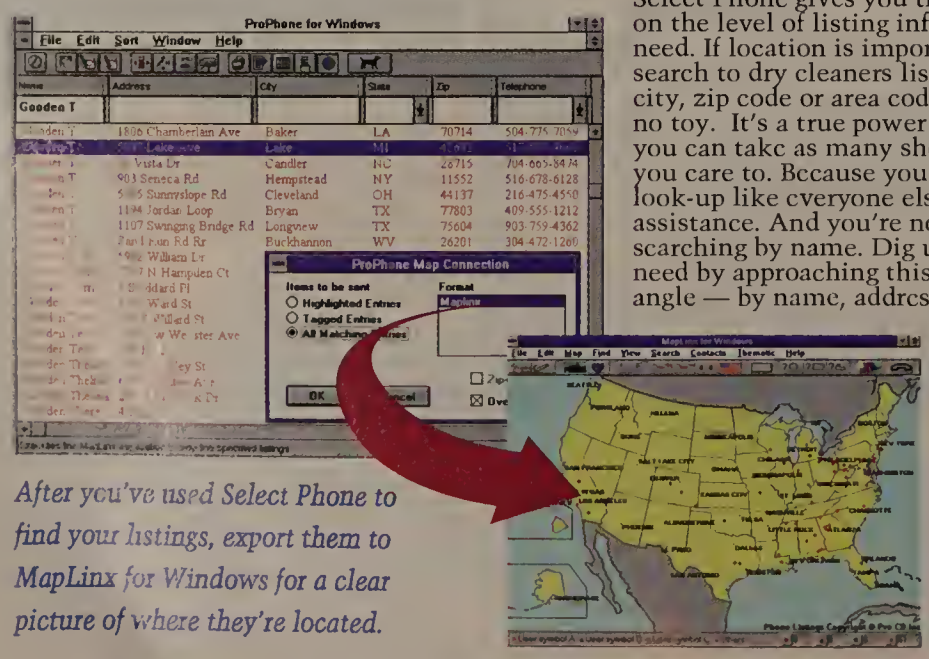
If you think of this CD-ROM as mere telephone listings in another format, you've only got one toe in the water. Its search and retrieval powers alone make it more akin to the radar screen on a nuclear submarine. It offers so many ways to compile listings that your list brokers may soon be reworking their resumes.

Turn listings into gold.

For their search and retrieval benefits alone you'll want to grab hold of these CD-ROM disks and weld them to your desktop. But they offer even more amazing features—some that boggle the mind. OK, so now you're selling flowers wholesale and need a count of all the florists in Maryland. No problem. Key in "florist" under business type and click on the little meter icon. There they are (all 289). Tag them. Now — hold on tight — download them to your own

You can even count them.

Select Phone gives you the ability to zero in on the level of listing information you most need. If location is important, narrow your search to dry cleaners listed within a state, city, zip code or area code. It's obvious this is no toy. It's a true power tool. And best of all, you can take as many shots at searching as you care to. Because you're not paying per look-up like everyone else who uses directory assistance. And you're not limited to just searching by name. Dig up all the listings you need by approaching this directory from any angle — by name, address, city, state, zip code, area code — even business heading. Heady stuff! It's like going from being a speck under a microscope to being the scientist looking into the lens. Except now your finger's on the focus knob.



After you've used Select Phone to find your listings, export them to MapLinx for Windows for a clear picture of where they're located.

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Click on the CD-ROM icon to choose which of Select Phone's five-disc set you want.

Click on the eraser icon to clear the screen for your next search.

Click on the checkmark icon to tag and untag listings that meet your search criteria.

Click on the door icon for a listing of neighbors or even occupants of the same building.

Click on the # icon to order listings by phone number.

Click on the head icon to sort listings by name.

Click on the mail box icon to sort listings by ZIP + 4 address.

Click on the printer icon to print tagged listings.

Click on the arrow icon to export listings to ASCII, database, word processor, or contact management software.

Click on the meter icon to get counts of a particular listing type.

Click on the phone icon to autodial when connected to a modem.

Click on the globe icon to see tagged listings in MapLinx for Windows.

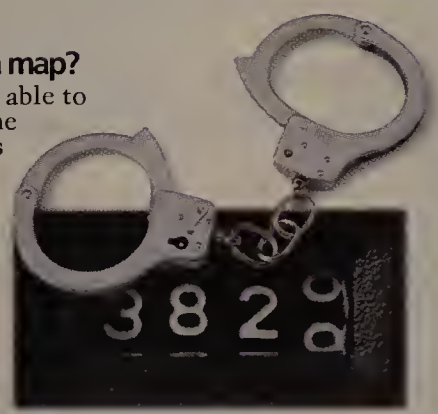
Click on Max the retriever to find a listing.

database or contact manager for a print out (that's right — like ACT!, Sharkware, Telemagic or Maximizer to name a few). Try a mail campaign. Generate sales leads. Even add phone numbers to those bingo cards you got from your last ad.

And this next feature is a killer. Say you're working a neighborhood or an office building with some great customers. You know their neighbors would be great prospects, too. You key in a good customer's name. Click on the little red door icon. Ding-dong. There's a hot new prospect list sitting on your desk. Can't quite see it yet?

How about a map?

Imagine being able to cherry pick the best prospects in your sales territory, then place them on a map for a quick picture of where they are and how they're clustered. Now you'll be able to do this and more. Because for a limited time, we're including a copy of MapLinx for Windows when you order Select Phone. But not for the $129 everyone else pays. You'll get MapLinx for Windows ABSOLUTELY FREE. MapLinx for Windows automatically converts Select Phone's listings to symbols on a U.S. map. It's used every day by thousands of sales, marketing, service and business professionals to locate competitors, nearby dealers, and new prospects. So when you're in Fargo and you're ready to hit those dry cleaners, you can map out your itinerary before you leave your desk. The only thing left for you to do is make sure you have enough product to fill all your new orders!



Many phonebooks restrict downloading or charge per name. Select Phone offers you unlimited and unrestricted downloading of all 80 million directory listings.

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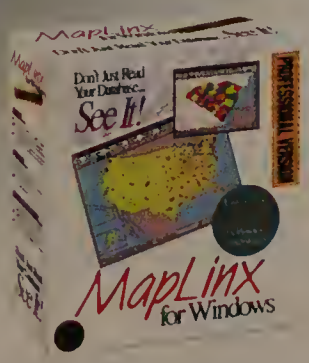

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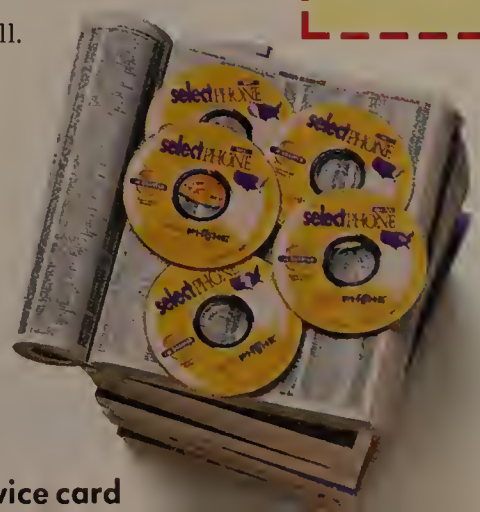

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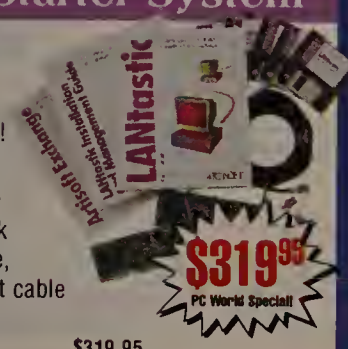

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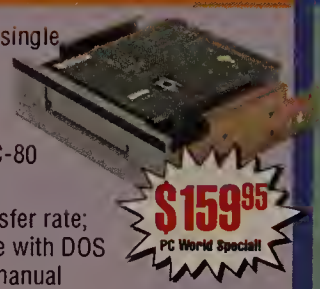

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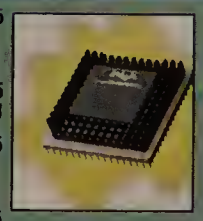

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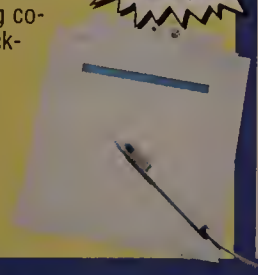

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Prem. Serv., Prem II 386SX/20, 25				
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Prem. II 386SX/20, 25	4Meg	500780-004	64 pin	189.00
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Premia 4/33S, 4/33, 4/50D, 4/66D	8Meg	501159-002		379.00
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OeskPro 386/20E	1Meg Exp 8d	113644-001	149.00
OeskPro 386/25E	4Meg Exp 8d	113645-001	279.00
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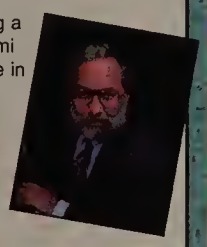

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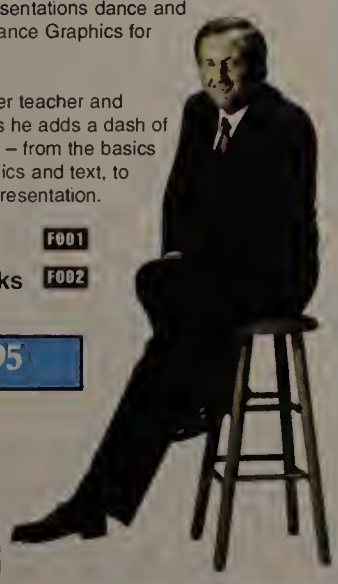

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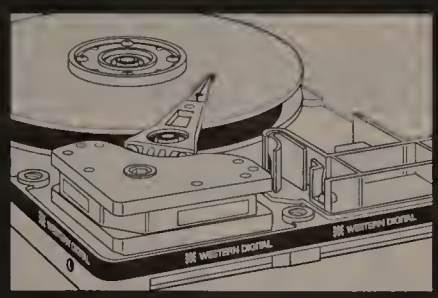

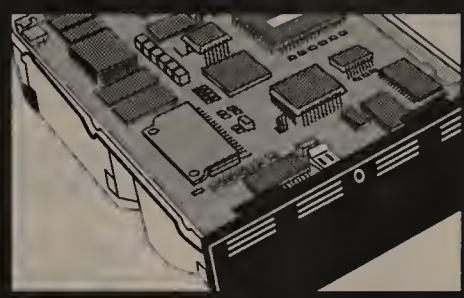

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420MB	14ms	CFS420A	$205
850MB	10ms	CNR850A	$419
1275MB	9ms	CNR1275A	$539

Maxtor

IDE			
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4294MB	8ms	MC3243AV	$2359
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341MB	13ms	ST3391A	$193
420MB	14ms	ST3491A	$205
545MB	12ms	ST5660A	$259
722MB	12ms	ST3780A	$375
1083MB	12ms	ST31220A	$495
SCSI (WIDE SCSI also available)			
1052MB	9ms	ST31200N	$579
1700MB	9ms	ST11900N	$1019
2145MB	8ms	ST12550N	$1219
2148MB	9ms	ST12400N	$1090
4290MB	9ms	ST15230N	$1889
4290MB	8ms	ST15150N	$2199
9080MB	11ms	ST410800N	$3459

HARD DRIVES

Quantum

IDE			
270MB	12ms	LPS270A	$175
342MB	12ms	LPS340A	$199
541MB	12ms	LPS540A	$252
SCSI			
170MB	14ms	ELS170S	$175
270MB	12ms	LPS270S	$189
342MB	12ms	LPS340S	$215
541MB	12ms	LPS540S	$265
1080MB	10ms	IMP1080	$579
1440MB	9.5ms	IMP1440S	$749
2160MB	9.5ms	IMP2160S	$999

IBM

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728MB	12ms	70G8511	$379
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527MB	12ms	94G2441	$289
728MB	12ms	94G2422	$449
1052MB	8.6ms	70G8492	$659
2040MB	9.2ms	70G8493	$1249
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SB= Sound Blaster 16 SCSI. SA= Sound Blaster SCSI ASP.

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CD50	$359	$485	$359	$425
XM3401	$425	$549	$425	$479
CDR510	$449	$569	$449	$499
XM3501	$569	$689	$569	$629
PX43CH	$599	$729	$599	$669

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A1522BASIC 16Bit SCSI	$139	$109
A1542CBASIC 16Bit SCSI	$239	$215
A2742 EISA SCSI	$359	$349
A2842 VESA SCSI	$259	$249
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S475I 32Bit Local Bus IDE	$129	$119
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S475S 32Bit Local Bus SCSI	$369	$359

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2Gig	Conner	4320	$749	$889
2Gig	HP	35470	$829	$969
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4-8Gig	Conner	4324	$859	$999
4-8Gig	HP	35480	$929	$1079
4-16Gig	Sony	SDT5000	$929	$1079
4-16Gig	Conner	4326	$969	$1139
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NEC 3X	$699	$1449	$2449
Toshiba 3501	$999	$2099	$3579
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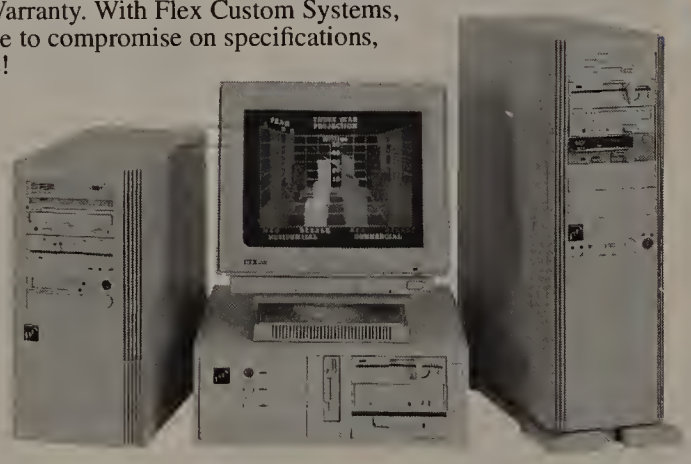

486 Systems feature

- 486SX, 486SX2 or 486DX2 32bit Processor
- 7 ISA 16 bit slots w/3 VLB 32-bit slots
- 4-64 MB RAM (Max.) • 256K Cache
- 3.5" 1.44MB FD (Dual Drive Optional)
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VL486DX2-66	*Desktop Case, 4MB, 420MB HD*	$1649
VL486DX2-66	*10 Bay Tower, 8MB, 540MB HD*	$1999
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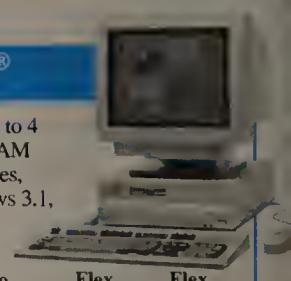

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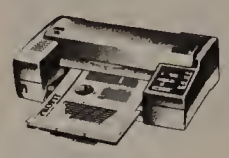

Key Features

- ► Model Stylus 800+
- ► 248 cps draft
- ► 300 X 300 dpi
- ► Monochrome printing
- ► 2-yr warranty

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Key Features

- ► Model BJC-600
- ► Color printing
- ► Up to 300 dpi
- ► 240 cps in draft mode
- ► 100 sheet auto sheet feed

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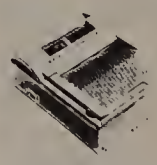

Key Features

- ► Model OL400e LED
- ► 4 PPM
- ► 300 X 300 dpi
- ► 512K memory
- ► 5-yr prithead warranty

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Key Features

- ► Model OL410e LED
- ► 4 PPM
- ► 600 X 600 dpi
- ► 2MB memory
- ► 5-yr printhead warranty

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*After $75 Rebate. Ends 12/31/94

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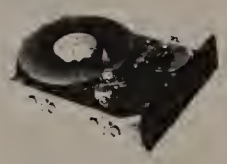

Key Features

- ► Model 7405A
- ► 3½" inch high
- ► 405MB
- ► IDE/AT
- ► 12 msec seek time

$199.95

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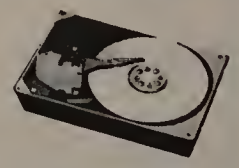

Key Features

- ► Model CPA-540A
- ► 3½" inch high
- ► 541MB
- ► IDE/AT
- ► 12 msec seek time

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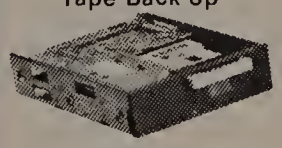

Key Features

- ► Model C250MQ
- ► 250MB back-up capacity
- ► Reads Qic 40 & Qic 80

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Key Features

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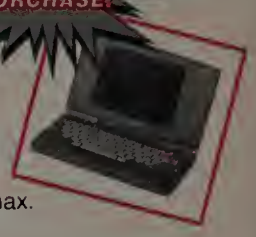

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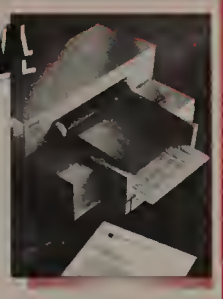

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2217AV 1.765GB SCSI AV	1099.22
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Acculogic VLB IDE	89.76
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WORLDPORT 14.4K pocket w/fax	228.94

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SmartUPS 1250	644.24
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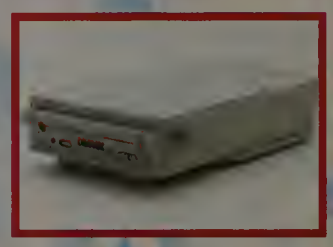

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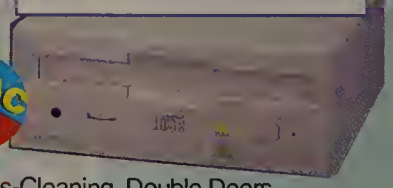

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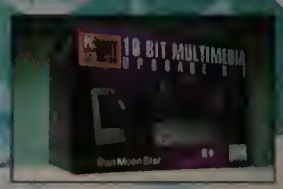

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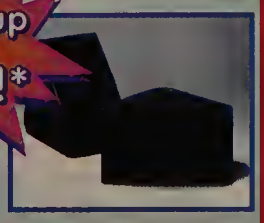

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- Allows multiple departments.
- Allows transaction posting to prior or future financial periods.
- Standard G/L financials provided.
- G/L Report Writer with which user can design up to 250 financial reports per company.
- Allows recurring journal entries.
- Allows multi company ledgers with or without consolidation.

ACCOUNTS RECEIVABLE

- Allows open item or balance forward accounting.
- Allows recurring transactions.
- Prints user defined or plain paper statements.
- Handles cash receipts and partial payments.
- Ages receivables with user defined periods.
- Prints mailing labels, 1 to 4 across.
- Payments can apply to up to 250 invoices.
- Provides aged report by payment date.
- Customer file shows: credit limit, collections status, finance charge, YTD charges and YTD payments.
- Reports can be sorted by: customer number, customer name, customer type, zip code, salesperson code or biller code.

ACCOUNTS PAYABLE

- Prints checks.
- Calculates early payment discounts.
- Ability to distribute to 250 G/L expense accounts per invoice.
- Cash flow analysis/forecast.
- Allows entry of prepaid invoices to be expended later.
- Prepares check register of all payment transactions.
- Accounts for prepaid expenses (i.e. insurance).
- Allows immediate checks (hand-written or printed).
- Provides aged reports by payment date.
- Prints 1099s miscellaneous.
- Checks for duplicate transactions.
- User can design up to 9 check formats.

ORDER ENTRY

- Allows adding stock items and customers on the fly.
- Allows real time update of inventory.
- Invoice for sales and/or service (allows billing for non-stock, special order items).
- Complete detail sales reports with user defined sorts.
- Hold order feature (quotes on unfilled orders).
- Allows customer credit limits and alerts to exceeded limits.
- Allows for cost of non-inventory and special orders.
- User-defined tax sales rates.
- Produces back order report by customer.
- Displays customer balance during invoicing.
- Allows recurring invoices.
- Allows price level lookup during invoicing.
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- Add vendors and inventory on the fly.
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- Tracks multiple vendors for each stock item.
- Lists economical order quantity.
- Allows reprinting of purchase order.
- User defined purchase order formats.
- Tracks promised date vs. actual date; quoted cost vs. actual cost.

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- Allows user to update federal, state, and local tax tables.
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- Submit W-2 on disk or magnetic media.
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- Prints checks.
- Allows "after the fact" payroll.
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- Allows reconciliations either from checkbook or bank statement.
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- Sorts checks by number, date, payee, vendor or employees.

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- Look-up by number or description.
- Allows quantity decimal precision up to four places.
- Supports up to 5 quantity price/break price levels on each item.
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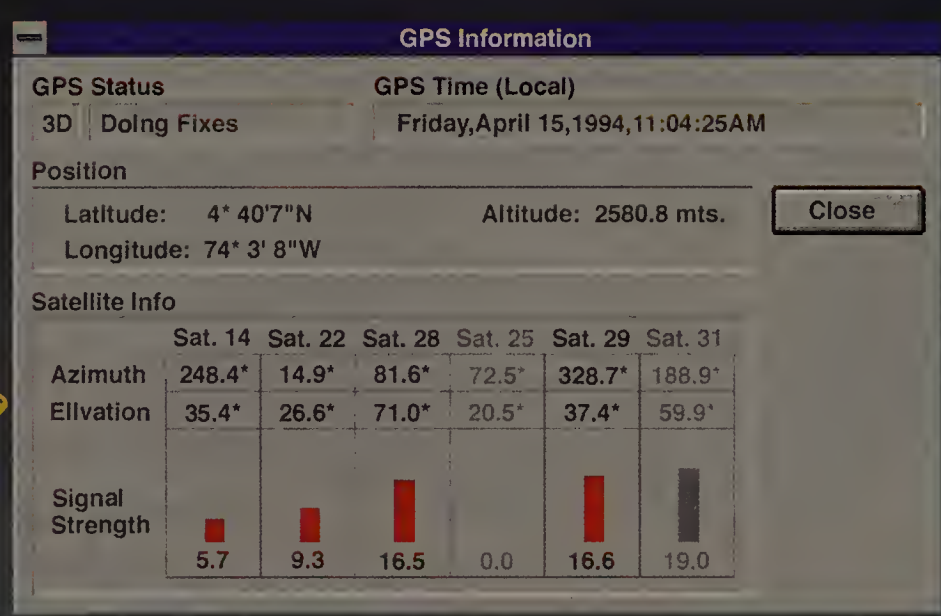

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953 DTP/Presentation software
954 Monitors and video boards
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A Savior for the Holidays and Everything You Should Read

New software—*really* new software—is always a turn-on, and Maxis's Gift Maker clearly qualifies. This cool Windows-based program lets you use the graphics and text formatting capabilities of your PC to create personalized designs for gifts like coffee mugs and T-shirts. You save your designs on a disk, then mail it to a production house in upstate New York, and voilà! Back in the mail comes your stuff.

Start by picking an item: anything from tote bags to attaché cases, neckties, oven mitts, teddy bears, even director's chairs. Once you've made your selection, you're presented with an appropriate-size design area, plus a set of plug 'n' play design templates. You can create your own design by using graphic objects included with Gift Maker, or by importing photos and graphics files you've created in other applications. Most popular graphics formats are supported, and you can use all your TrueType fonts.

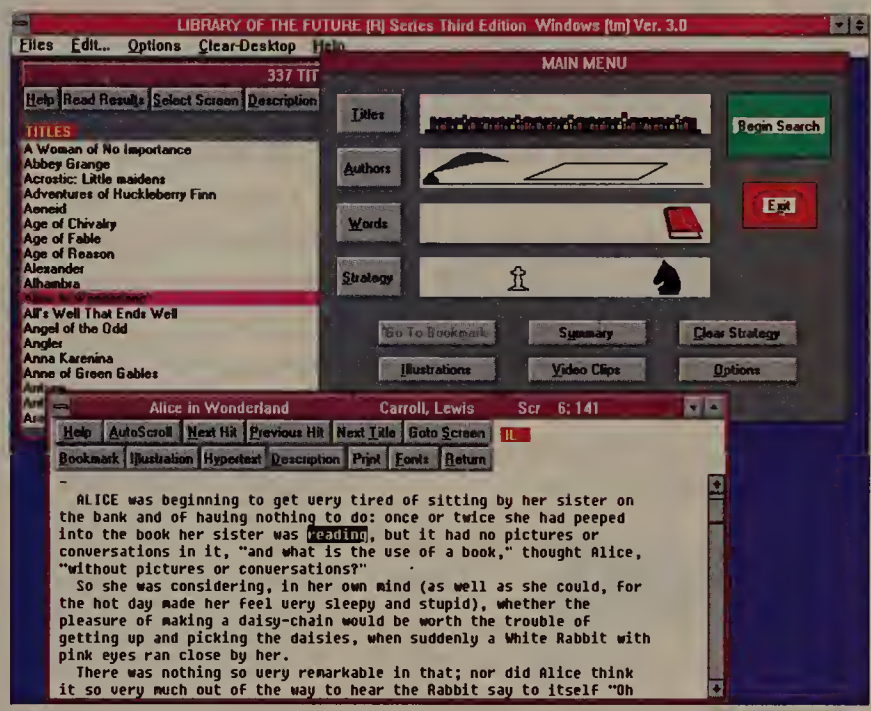
Once you've got a design on the screen, you can change the text to add a special name, or rewrite the message, or swap the colors and the fonts. You can add borders, flowers, or cats. You can reformat the type to make it italic or curved, or juggle it into a wacky layout. In fact, you can do just about anything you want with your design.

The gifts are not excessively expensive to order. A tote bag runs you as low as 12 bucks. T-shirts go for $14 to $16. Even a teddy bear is affordable at $26. For the retail-challenged among us, holidays, birthdays, and anniversaries may never hold the same terror again.

Little Big Library

Visualize huge. CD-ROMs' capacity for so much data makes them perfect for big infotainment applications with multimegabyte picture and sound files. Now forget multimedia entirely and imagine how much plain text you can store on a CD-ROM. How about 3500 fully searchable novels, stories, essays, poems, and religious documents?

That's what World Library has done with Library of the Future, Third Edition (which also rated inclusion in this month's feature "Best CDs of '94"). You get a breathtaking selection: Every play and poem Shakespeare wrote, complete collections of Sherlock Holmes stories, Aristotle, Aesop, Lewis Carroll, and Geoffrey Chaucer, and that's barely the beginning. Just listing all the famous authors and great works would run me out of column space.



I used the built-in search utility to scan the entire collection for quotes that include the word "book." There are hundreds, but I particularly like this one from *Alice in Wonderland:* "What is the use of a book without pictures or conversations?" One appropriate answer might be "to search on."

On with the Search

Unfortunately, I found a few bugs in Library of the Future's search routines. In most cases you can limit a word search to selected titles—such as all Shakespeare's plays. But some titles (such as Freud's *Interpretation of Dreams*) cannot be searched as individual volumes, only as part of an entire set. (Fortunately, this bug has been swatted; if your copy misbehaves, contact World Library for an update.) Still, the search features are fast and effective for the most part, and you can export text to any application you like.

The CD-ROM comes with Windows and DOS versions of the program. The DOS version, which runs fine in a DOS box under Windows, is much quicker. Under DOS, if you want to select Shakespeare, all you do is type *S-H-A* and by the time you hit the *A* the highlighted selection bar is resting on Shakespeare. In the Windows version, you hit *S* to move to the top of the S's; then you have to scroll down to Shakespeare manually—and it's quite a scroll. If you try typing *S-H-A* you'll end up on top of the A's.

Imagine how much plain text you can fit on a CD-ROM–that's what Library of the Future has done.

Library of the Future isn't as flashy as the latest multimedia apps, but it's the kind of reference package I know I'll turn to again and again. I can't wait for someone to offer searchable disks of Chandler, Pynchon, and Heinlein.

- **Library of the Future, Third Edition,** $149.95; World Library, 800/443-0238
  Reader service no. 610
- **Gift Maker,** $44.95; Maxis; 800/336-2947
  Reader service no. 611

By Michael Goodwin

Michael Goodwin is a contributing editor for PC World. *He can be reached on PC World Online (see page 12 for contact information).*

Visions of Sugarplums

To paraphrase the Duchess of Windsor, "You can never be too rich or too thin—or have too big a hard disk." Ain't that the truth. So I immediately went shopping for some Ultra Slim-Fast. Just kidding. Instead, I pitched a holiday wish-list column to my editor, and he actually went for it. "Great idea, Bass. Figure out what you need to get your home office up to speed. Don't be shy; you've got a blank check," he said.

First on my list is a hard disk. Seems like most applications want 15MB nowadays and I'm always running out of room. I've used a 540MB Conner drive for years without a hint of trouble, so I opted for the company's CFP2107 2GB hard drive. Talk about breathing room. I'll tell you, few things feel as good as seeing CHKDSK report that I've got 1.5GB of free space. At least for the time being. At $1200 the Conner drive isn't cheap, but it flies: 9ms and a data transfer rate of 87 megabits per second. I've also seen the company's 1GB model at a West Coast electronics superstore for an astonishingly low $670, or about 60 cents a megabyte. • *CFP2107 $1200; Conner; 800/426-6637. Reader service no. 601*

Generation 4X

Last year I was dazzled by my external CD-ROM drive's double-speed performance. But today? I can't imagine what's taking it so long. So next on my list is Plextor's 4Plex half-height internal quad-speed CD-ROM drive. I installed a 4Plex and watched it zip along at a fast 600-kilobytes-per-second data transfer rate, with a 220ms random access speed and a 1MB buffer (see "Best CD-ROM Drives and Sound Boards"). Remember when it used to be a bored and stroked 8-cylinder, dual-barreled carb with an overhead cam, chopped and channeled? Yeah, well, I think it's a testosterone thing. I've seen the 4Plex discounted to about $439, but you may be able to find a lower price by the time you read this.

Unfortunately, not all applications written for double- and triple-speed drives take full advantage of the 4Plex's technology. But when those quad-speed apps hit the street, you'll see 30 frames per second and 24-bit color. That means smooth, full-motion video without that dubbed-foreign-film effect of the voice not matching the picture. And with an internal unit, I'll finally recover some of my ever-shrinking desk real estate. • *Plextor PX-43CH $549; Plextor; 800/886-3935. Reader service no. 602*

Gee-Whiz Technology

As you've probably guessed, I prefer building my own system. But if I had to "buy" a new system (Mom, if you're reading this, the 386SX system I got you is just *fine*, really), it would be an AST Premmia GX P/90. The machine's got almost everything I'd want: a 90-MHz Pentium with 16MB of RAM, a 256K second-level synchronous cache, a 730MB SCSI hard drive, a built-in FastSCSI-2 controller, a PCI-based 64-bit graphics card with 4MB of VRAM, and a double-speed CD-ROM drive.

And when it comes to moving data to and from my notebook, the Premmia comes through with PCMCIA capability. I can also connect my wife's machine thanks to the Premmia's built-in ethernet support. This is a definitely a holiday wish-list system, because the Premmia *without a monitor* will easily set you back over $5000. • *Premmia; AST; 800/876-4278. Reader service no. 603*

Call me a techno-nerd but I'm enamored with gadgets. So the next time I'm out of town and seriously concerned about getting lost, I'll just whip out my Mobile Global Positioning System, stick one end on the car window (or my plane window, for that matter), and plug the other into my laptop via a PCMCIA card. In no time flat, 20 satellites orbiting the globe will pinpoint my exact position (to within 25 meters) anywhere in the world and project it on a special version of Automap's Auto Streets. Can the rollerblade version be far behind? • *Mobile GPS with Automap, $695; Socket Communications; 800/564-6277. Reader service no. 604*

The last item on my list is a fast modem. You see, while the world is zooming at 28.8 kilobits per second, I'm still chugging along at 9600. So I ripped out my old internal modem and connected an external U.S. Robotics Courier V.Everything fax-modem. I chose an external unit because of the Courier's invaluable volume switch: Late at night I can hear the connection and easily lower the volume before it wakes anyone else. • *Courier $595, internal model $545; U.S. Robotics; 800/342-5877. Reader service no. 605*

But one question is still nagging me: *Whose* blank check?

By Steve Bass

Contributing Editor Steve Bass is president of the Pasadena IBM Users Group. He can be reached on PC World Online (see page 12 for contact information).

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